Nature Magazine

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MAY 1941
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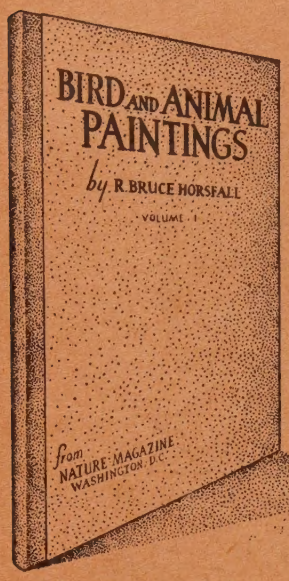

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Have you not often wished for an accurate source of information about the name of a bird or animal or insect? On a walk, a camping trip, or while exploring new country, how often arises the question "What is it?" An animal flashing through the underbrush or scampering across the trail instantly arouses one's curiosity. For lovers of nature who wish to become familiar with the various species of wild life in this country, we offer a valuable aid and a genuine bargain in this book.

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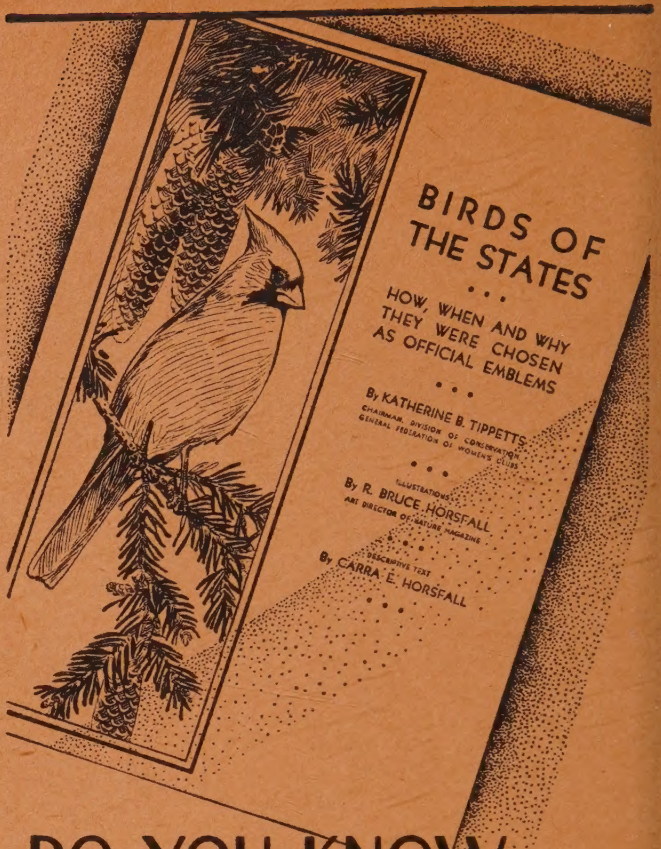
BIRDS OF THE STATES
HOW, WHEN AND WHY THEY WERE CHOSEN AS OFFICIAL EMBLEMS
By KATHERINE B. TIPPETTS
By R. BRUCE HORSFALL
By CARRA E. HORSFALL

DO YOU KNOW The Bird of Your State?

or of the 42 other states that have adopted official birds?

The movement to select an official bird emblem for every state only recently was launched as a nation-wide movement. Some of course had adopted official birds earlier. Altogether, 43 states have now selected a bird to represent them as an emblem.

The fascinating story of how, when and why the various states selected the birds to represent them is told in this book by Katherine B. Tippetts, former Chairman of Conservation, General Federation of Women's Clubs. Illustrating the book are 30 full color paintings of the various birds by R. Bruce Horsfall, the famous wild life painter, with descriptive text by Carra E. Horsfall.

Every home and every school should have this book. It is a fascinating bit of history combined with an authentic and interesting survey of the birds of America. A handy table in the front lists the birds together with the official flowers of the states.

The 16-page book, with 30 illustrations, is offered to readers of Nature Magazine at 25 cents a copy. On orders for ten or more copies, the price is 10 cents a copy.

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Nature Leaders' Course

To meet the growing need for leaders with field experience a Nature leaders' training course will be held for the second summer by the Virginia Natural History Institute from June 23 to August 1. Five weeks of outdoor study under outstanding instructors at Swift Creek near Richmond, Virginia, will be followed by an optional week afield to nearby National and State Parks. Five credit hours will be given by the Richmond Professional Institute of the College of William and Mary to those satisfactorily completing the course. Sponsors include the National Park Service, National Recreation Association and Virginia State Conservation Commission. For details address Virginia Natural History Institute, 907 Grace Securities Building, Richmond, Virginia. Board, lodging, tuition and incidentals will approximate $100 for the six weeks.

For the Starling

"We haven't enough starlings," declares Clarence Anson, Westfield, New York, tree surgeon, whose work has given him an opportunity to observe birds while caring for trees. He writes that he cared for the trees on two large estates for a period of eight years, and that for some time starlings had congregated there by the thousands. Various attempts were made to discourage the birds, but, Mr. Anson asserts, these failed until he had eliminated certain insects on the trees. (He fails to tell us what insects.) Forthwith the starlings disappeared, as have most other birds. He believes that cessation of insect control will bring back the birds, and that the drives against the starling are a waste of time and money.

Nature Course

Another summer Nature course has just come to our attention, this one connected with the Huckleberry Mountain Artists' Colony at Hendersonville, North Carolina. The course is under the direction of Mabel T. Rogers and will be held from July 28 to August 11. We have no further details.

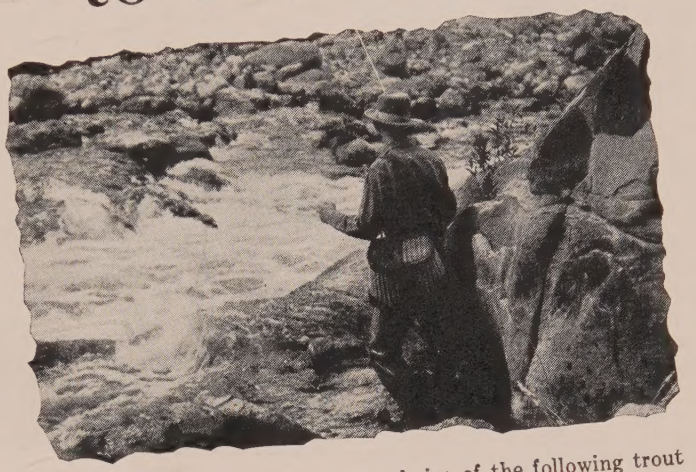
HERITAGE

By W. S. SKELTON

The old gentleman was in a pensive mood. "Do you know," he said, "we have a rich heritage. I couldn't sell for a dime, and wouldn't sell for a million dollars, my right to hear the roaring splash of the sea as it pounds against the rocky shore . . . To hear the rushing, thundering, thudding of a mighty waterfall . . . My right to walk along the shore of a placid, steaming lake, its surface punctured once in awhile by a trout, or disturbed by a swan . . . My right to inhale exhilarating mountain air spiced with wild flowers, snow water and pines . . . My right to quench my thirst in a clear mountain stream. My son, life would be meaningless without such free gifts."

I have pondered the old man's words many times. Why do not more of us have and talk such philosophy?

Take it easy
–to Yellowstone



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Camera Trails

BY NORRIS W. HARKNESS

Using the Close-up Lens

In the December, 1939, Camera Trails we discussed supplementary lenses, the lenses that slip over the regular camera lens and permit making pictures at shorter distances than the lens alone can be focused. Such lenses give much larger images on the film, but they must be accurately focused and there must be no doubt about the actual field that will be included on the negative, so their use requires careful measurement of the distance from the lens to the object and sure knowledge of whether the view finder sees just what is in front of the lens.

To keep the necessary table of focusing distances at hand and then to estimate the difference between the fields of view of the finder and of the lens for each shot takes too much time for living subjects and allows too much margin for error. It will be better to have some device that at once establishes the correct distance and makes plain the area included in the picture, and such a gadget is easy to make.

The one I use is made of a length of stiff wire—a wire coat hanger. In one end is an eye that is used to hold the wire to the camera with a screw into the tripod socket, and the wire stands out in front of the camera at an angle that brings it just outside the angle of view of the lens. Sixteen inches in front of the lens there is a right angle bend and seven inches from it is another. There is seven inches more wire beyond the bend. The first of these seven-inch lengths is parallel to the bottom edge of the film and the second is parallel to one vertical side. So the two lengths form one corner of a square whose center is sixteen inches from and directly in front of the lens and whose sides are each fourteen

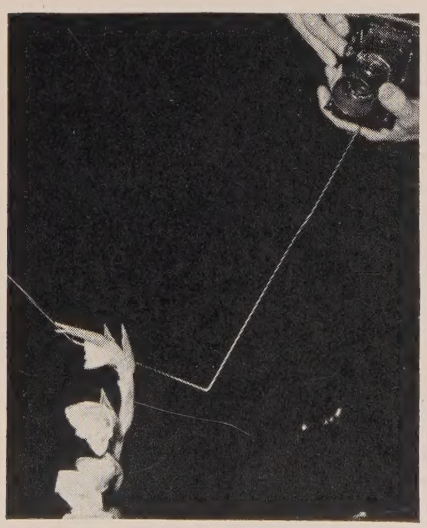

Figure 1.

inches long. Figure 1 shows the use of the gadget. The camera is held firmly against the body with the subject opposite the end of the wire and the first bend so that it is in the center of the fourteen-inch square and sixteen inches from the lens. Very little practice will let you find the right location quickly and easily. If you prefer, you can complete the square, but it is often difficult to get the whole square into position when working outdoors and it is bulky to carry, so the partial square is usually best.

But the dimensions above are right for my lens; they may be wrong for yours and you will have to check both the actual focusing distance and the size of the field you will find on the negative with your camera and supplementary lens. The lenses vary in their focal length and that is the important factor in finding their working distance. The quickest

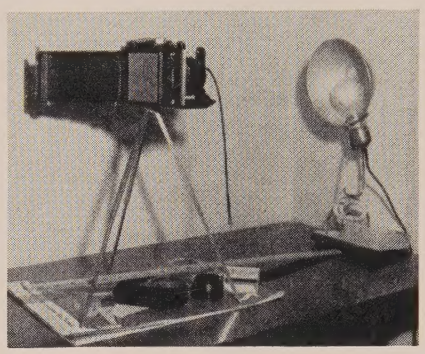

Figure 2.

way to do this is shown in Figure 2. The camera with its supplementary lens is placed opposite a lighted electric bulb on which you have scrawled lines with ink. Set the focusing scale of the camera on the desired distance—in my case five feet—and fasten a piece of ground glass or waxed paper to the back of the open camera so that the paper or the ground side of the glass lies in the plane the film will later occupy. With the shutter open you can see the lines on this temporary focusing back and will be able to determine accurately the distance at which the lines are sharpest when the diaphragm is wide open.

Then with the diaphragm stopped down to perhaps f/16, you can find the nearest and farthest distance from the lens at which the lines are sharp and you then know the usable depth of field at that stop. You will, of course, make a note of these figures and use the first focusing distance as that of the first bend from the lens. In my case the focusing distance was sixteen inches with the lens wide open and the usable depth extended from 13¼" to 21".

Such a gadget will let you make pictures that used to get away from you—pictures that will be different and worth many times the trouble. And do not forget that many of your best Nature subjects are small!

Do It in Color

Anyone who reads the modern magazine realizes the importance of color in the minds of advertisers—the people who know best how to make us look at the story they have to tell. They have found that the same picture in black and white falls far short of the pulling power of the print that has all the realism and depth and excitement of the full-color picture. As we Nature photographers know, black and white prints, or lantern slides, can be of great interest in showing the formation and markings of a flower or a moth, but we have heard the exhibitor of those same excellent slides say that "You ought to see the delicacy of the colors," or some other regretful statement that proved he wished he had worked in full color.

Undoubtedly the time is coming when we shall make most of our pictures in color and some method will be developed to make color prints as easily and quickly as we now work in monochrome, but color photography is still a strange and unfamiliar mystery to most amateur photographers. It should not be. Any camera user who can make good pictures with reasonable consistency and who has the desire to do good work can make color transparencies that will be accurate in every detail and that will be so superior to the monochrome slides that he will never willingly go back to his earlier medium.

The chief difference between color and black and white work is in the mind of the photographer. In his whole career as a camera man he has been training his eye to ignore color and to see variegated objects in tones of gray. Then he loads his camera with color film and immediately suffers from a complete lack of knowledge of color composition. Usually he picks out all the most brilliantly-colored objects nearby and makes pictures, if you can call them such, that are a riot of every tint in the rainbow. Then, as he gains more experience, he learns to select gentler tones and to eliminate most of the more vivid ones. The change in his seeing is rather like the lessons in simplification he had to learn in monochrome, but when he has begun to see again in the natural tones of the subjects, his work is more real, more interesting, and more informative to the rest of us.

The other big difference we find in shooting color is the smaller latitude of the new film and the consequent need for more accurate exposures. Black and white film may be given two or three stops too much, too little exposure, and the difference in the negatives can be compensated for in the printing. Color film, however, must be exposed correctly for it is developed by the reversal process that permits of no correction of the original exposure. The same celluloid strip that we put into the camera is processed and returned as the color positive. It is too dark if the exposure was not sufficient and too light if it was too great. The less latitude also shows in the need for flatter lighting. In black and white work, a side lighting is far better to give depth and roundness to all the elements in the picture and the great latitude of the emulsion renders both the highlights and the shadows correctly even when they are very different. With color film, however, the light should be more nearly behind the camera to reduce both the quantity and the depth of the shadows and bring the light reflected from the various parts of the picture more nearly to the same intensity. The color shadings and the depth given the whole picture by its realism of color will more than make up for the lost effectiveness of the side lighting.

The color films available are Kodachrome, in 35mm and cut film sizes, and Dufaycolor, in rolls and cut film sheets. Kodachrome must be processed by Eastman at one of their central branches and Dufaycolor may be done at home by following the directions that come with the film. These direction sheets also contain exposure data that work well after a little experimenting, or if no meter is available. Probably Kodachrome in the 35mm size will be most popular for projection in the small 2" x 2" slide frames and inexpensive

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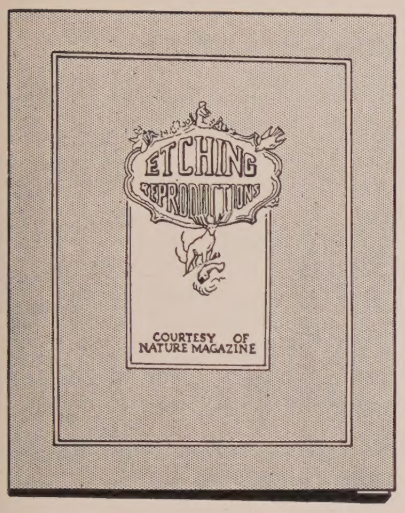

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machines, and there are a number of adapters to handle the small film in cameras that were intended for larger film sizes. Several have been listed in This and That.

So try some color film. It does cost a little more than the black and white, but the results are so satisfying and the effect on your audience when you project it so pleasing that you will be glad you made the shift.

This and That

General Electric has brought out a new, small flash bulb that works wonders for the Nature photographer who has no synchronizing equipment and uses the open flash method. The new bulb, the Speed Midget, is the golf-ball size of the No. 5, but has only a heavily-coated filament and a sort of antenna instead of the usual foil or wire. Its most important characteristic is the short duration of the flash, only 1/100th second, that will let you stop motion much better than do the other bulbs whose flash lasts three or four times as long. It gives about one quarter as much light as the No. 5.

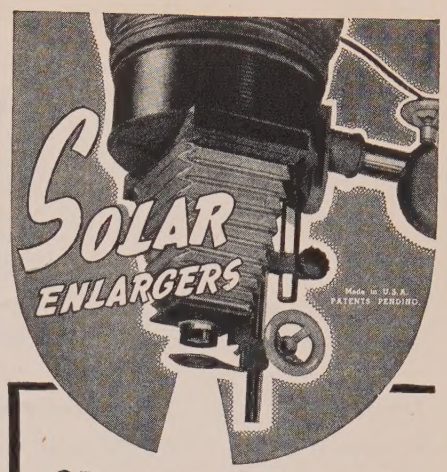
While we are on the subject of flash, Wabash has published a new Wabash Exposure Bulletin that gives all the data you need for any kind of flash pictures in black and white or color. Write for your free copy, mentioning NATURE MAGAZINE, of course, to Wabash Photolamp Corp., Brooklyn, N. Y.

Agfa Ansco of Binghamton, N. Y., has recommended that all its films and papers be developed at 68 degrees. New editions of all its instruction sheets will be available shortly. The one temperature will simplify darkroom work and lead to better pictures.

Eastman Kodak, Rochester, N. Y., has added to its line of helpful booklets a new "Kodak Data Book, Slides and Transparencies" at 25c. It will be especially valuable to those Nature photographers who use either 35mm or the regular 3¼" x 4" slides for projecting their pictures.

Has your camera been cleaned since the winter's use or, even worse, its layoff on a closet shelf? Better check it for leaks in the bellows, dirt on the lens surfaces, or dust inside the box. Loosen the dirt with a soft brush and blow it out, but treat the lens gently. The tiniest bit of grit on the material you use to wipe the glass may mar its shine and make further pictures a little less sharp than you would like to have them.

How do you hang your pictures? Frames are heavy and expensive when the prints are in the usual 16" x 20" mats and most methods fail to give the prints the setting they deserve. I have hung all mine with Braquettes, the metal strips that hold the top and bottom of the mount and are connected by cords that clamp tight. The pictures can be changed in two minutes and the Braquettes set them off well at a cost of only one dollar for each one on the walls. Write for details to Braquette, Inc., 225 Fifth Avenue, N. Y.



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NATURE MAGAZINE'S
Resort, Camp and Travel Service

Where to go . . . What it will cost . . . How to get there

* * * * *

Often definite travel information is a problem and a puzzle to solve. To be informative at all, information must be accurate, specific and complete.

Scenic splendors are before us at all times. We have that urge to see these great things too, BUT . . . where was that picture painted, that scene photographed; where is this lake and that rock-bound coast; at what season of the year are they to be seen at their best; where can we stay when we arrive; is it best to travel by air, land or sea; what will the trip cost for a day, a week, a month or a season? These and many more problems face every Nature lover and traveler at this season of the year.

Memorial Day seems to be about the time we begin to think of RESORTS, CAMPS, TRAILER TRIPS, A SEA VOYAGE, and so on. Yet every year, the same old technique—Mother writes volumes of inquiries, to hotels, steamship lines, camp counselors—Father makes personal inquiries, of his traveling friends—with the same old result, off we go only half prepared for what we find, missing many points of interest.

This year of 1941, more than ever, our problems will be doubled. Steamship lines are giving their boats to Uncle Sam. Railroads are crowded with movements of troops, supplies for defence, etc. Now, more than ever before, we must plan our trips but now, as never before, the task will be made easier.

SOME SUGGESTED VACATION PLACES

Resorts & Resort Hotels

The Inn, Buck Hill Falls, Pa.
Chateau Frontenac, Quebec, Canada
Chalfonte-Haddon Hall, Atlantic City, N. J.
Cloister Hotel, Sea Island
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Bryce Canyon
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Mt. Rainier

Olympic National Park
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Itasca State Park, Minn.
Mt. Rushmore
Black Hills

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Green Mt. Nature Camp for women, Randolph, Vt.
Hackmatack Camp for young naturalists in Berkshires.
N. H. Nature Camp for Men and Women, Holderness, N. H.

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Nature in Print

By HOWARD ZAHNISER

NOT long ago during the conviviality of a banquet I was invited by my complimentary friend Waldo Schmitt, of the Smithsonian Institution, to become a candidate for the Washington chapter of The Explorers' Club. Somehow or other I knew better than to accept the invitation or even mention the few rather trivial expeditions I have made, in the same sort of explorer's spirit that a boy has when he prowls through his backyard "jungles"—a few mountain climbs in national parks and forests, some canoeing as a "voyageur" through the town-peppered wilds of the Allegheny, and a bit of gazing at the ocean at least five thousand, two hundred and eighty feet from the nearest summer resort.

I did, however, recall having written a college sonnet on exploration, with an octave disposing of the great romancers and explorers and a sestet proclaiming my own successes. Strangely enough, my would-be sponsor for The Explorers' Club professed to see some qualification in the sonnet as described and urged me to publish it as evidence. My chagrin can thus be imagined when I failed to locate the verses in manuscript and found only the sestet, in the dark recesses of memory, to wit:

> But Helen's love is sweeter far
> Than all the lovely poems are;
> My meadow larks sing sweeter notes
> Than tropic birds with gayer coats;
> And I am always thrilled when I explore
> The sky and gullies just outside my door!

The banquet incident is recalled to me now, not by any resurgent ambition to be recognized as an explorer, but by the very domestic experience of reading two books that once again recall the sonnet—Vilhjalmur Stefansson's *Ultima Thule,* and August Derleth's *Village Year.* "Stefansson" is a name to be conjured with in explorers' circles, and among romancers there are many overtones suggested by the geographic term "Ultima Thule" long ago taken over by the poets. "Derleth" is a name not so well known as it will be in the future, I opine, and "Village Year" describes nothing exactly exploratory or thrilling when first spoken. Yet I found more of the thrills of exploration reflected in *Village Year* than in *Ultima Thule,* as perhaps I should with my own backyard and bookworm experience.

The impression is, of course, meant to be complimentary to *Village Year* and not derogatory of *Ultima Thule.* Stefansson's book is a valuable, informative work—a serious discussion of one of the geographers' puzzles by one who has explored ultimate regions of our own time. From the long-ago writers and critics of Pytheas and Columbus and from the Arctic literature of modern times, Stefansson has assembled the evidence pro and con regarding the identity of Ultima Thule and the likelihood that it was visited by "the earliest of the great explorers" or by the discoverer of America. To this evidence he has added his own experience with what he called, in an earlier book, "the friendly Arctic." His impressions are quite the opposite from the imaginings of the poet Thomson (whom Stefansson does not quote) concerning this region—

> Where the Northern Ocean, in vast whirls
> Boils round the naked melancholy isles
> Of furthest Thule.

Although leading one to believe that even centuries ago far northern voyages would not have been impossible for Pytheas of Marseilles or Columbus, Stefansson leaves with the reader, as his own private detective, the mystery of Ultima Thule and its early explorers.

Stefansson's notable explorers are all travelers. There is, of course, a sense in which the two are synonymous, but since Henry David Thoreau wrote that he had done a great deal of traveling—in Concord—there has been less of a tendency to identify exploration exclusively with distant travelings. August Derleth in Sac Prairie, Wisconsin, seems to be the same sort of explorer that Thoreau was in his Massachusetts town. Like Thoreau too, and William Brewster later, Derleth has also formed the enviable habit of keeping a chronicle of his explorations in a journal. To the enrichment and enjoyment of the readers who share Derleth's own life span, these Sac Prairie journals have not waited for a posthumous publisher. The records reveal that August Derleth was born in 1909 and that he is the author of some twenty earlier volumes of mystery stories, historical novels of Wisconsin, and poetry. Yet in *Village Year* we are conducted three times through the seasons by one who seems entirely undistracted by the rush of the twentieth century, completely at ease to observe brook sides made white and green by dutchman's breeches, or to perceive the essential characteristics of his fellow villagers.

Zona Gale, on one of her visits to Sac Prairie, told Mr. Derleth: "It seems to me that to be really creative, one *must* live in a small place." Mr. Derleth's experience as recorded in *Village Year* and evidenced in his novels and poems would seem to substantiate her opinion. This same experience might perhaps also indicate that to be observant of the outdoors, in its spirit, one should live in a small town. As Zona Gale said further, "It is restful, it's away from struggle and the harshness of city living."

Mr. Derleth's journals for May, for example, describe dutchman's breeches, anemone, hepatica, and a half-dozen other flowers; night heron, whippoorwill, bittern, and a dozen other birds; and hylas and woodchucks. Undoubtedly August Derlth has a poet's (Continued on page 291)

Books discussed in this article are:

Ultima Thule: Further Mysteries of the Arctic. By Vilhjalmur Stefansson. New York: The Macmillan Company. 1940. 383 pp., with 17 maps and illustrations, bibliography, and index. $3.50.

Village Year: A Sac Prairie Journal. New York: Coward-McCann, Inc. 1941. 314 pp., with 23 wood engravings by Frank Utpatel and an endpaper map by Hjalmar Skuldt. $3.

"ALL DAY LONG DENALI LOOMED AGAINST THE BLUE SKY"

NATURE MAGAZINE
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Crowded Hours With Denali

By IRA N. GABRIELSON
Chief, United States Fish and Wildlife Service

THE rain poured steadily as the "Brill" car chugged up the Susitna River toward McKinley National Park. Brill car is Alaskanese for a Diesel-powered railway unit—engine, coach, and all, in one—similar to some of the transportation hybrids seen on branch lines in the States. It was still raining as we got off the car at the Park station. The rain had occasioned a slight argument between my companion and myself. He started it with the assertion that my luck had run out and that I was not going to see the "mountain." I, relying on a phenomenal run of luck that had brought good weather when most needed during the previous two months—even in the Aleutians and Bering Sea, so notorious for fog, rain, and wind—retorted just as positively that I would see it.

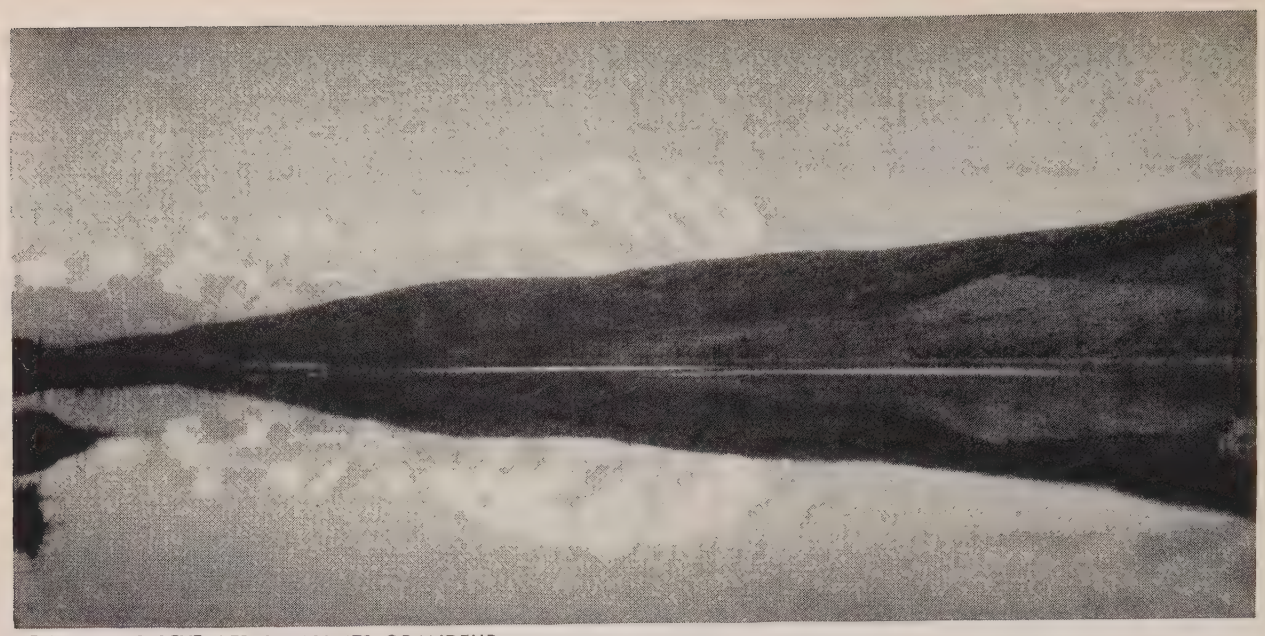
When we met the Park Ranger at the station, a question brought the information that the mountain had been out the day before, but had retired into blankets of mist. He volunteered further that it would probably be from three to five days before the peak would again be visible. I continued to assert that my luck and my control over the weather (which control was seriously questioned by others of the party) would guarantee me a view of it. Preparations were made, therefore, to travel the eighty-odd miles to the overnight cabin maintained by the National Park Service on Wonder Lake. Mountain or no mountain, view or no view, we were bent on going as there were two members of the Fish and Wildlife Service working in the Park whom I wished to see. We were just ready to start when Frank Glaser, one of the men, drove in and it was not long before the other, Adolph Murie, joined us.

As we drove, the rain slackened and just as we arrived at Wonder Lake the clouds commenced to lift. Murie and I got out of the car to watch, and as we did so the fog cleared away from the base of the mountain. Slowly the clouds rolled back and, in a few breath-taking moments, Denali was revealed in all its grandeur. Midnight was drawing near—and the majestic mountain stood before us, the most magnificent and inspiring scenic spectacle I had ever seen. Words are but feeble tools to describe the experience. It was as if one beheld the unveiling of one of Nature's greatest masterpieces. The two of us stood with little to say until the sense of passing time roused us to action. There were many things to be done and tomorrow morning's sunrise was a scant two hours ahead. We went into the cabin, where Dufresne and Glaser had preceded us, and went to bed. The date was August 2, 1940.

As I lay watching the landscape through the open windows, I could not help speculating on the practice of the white man of attaching the names of political heroes of the moment to such great natural spectacles. How much more appropriate the Indian name "Denali" seems. This word has been variously interpreted as "the high one," "the great one," and "the home of the sun." Any or all of these meanings, reflecting the reaction of primitive minds to the majesty of North America's greatest mountain, are far better than any personal dedication.

At two-thirty we were up to find the mountain again shrouded in clouds. Calling attention to my demonstrated skill as a prognosticator and as a weather-control expert, I announced that the mountain would clear in a short time—and clear it did, early enough for us to see and photograph its matchless reflection in Wonder Lake.

Then followed one of the most delightful days of a lifetime. On the rather hurried trip of the previous afternoon and evening, I had noticed many things to which I promised myself to give closer attention. The road was largely above timberline and the country abounded in small lakes and was well populated with birds and mammals. I counted some sixty-five mountain sheep, one grizzly, and several caribou from the car. We found time to stop and look at a pair of long-tailed jaegers, with fully-grown young, as they perched on the little hummocks of the tundra or flew gracefully about overhead. The scenic background for the aerial evolutions of the birds was far



DENALI WAS REVEALED IN ALL ITS GRANDEUR

Thus named by the Indian to express "the high one", "the great one", or "the home of the sun", Mount McKinley exemplifies its native name better than its commemorative one. Photograph by the author

different from the bleak landscape of Nunivak and the tumbling waters of Bering Sea where I had last seen the species. To my great delight we had already observed a number of wheatears, those interesting thrush-like birds with the appearance, at some times, of a bluebird and at others of a McCown's longspur, and with the behavior of a pipit. These experiences and many others had only whetted my appetite for the big day.

The weather was perfect. We could not have ordered better if we had tried. All day long Denali loomed against the blue sky, dwarfing into relative insignificance its neighbors—great mountains in their own right in any other presence.

The day started right. Before we left the cabin the melodious whistle of the upland plover floated in through the open door. Strange place for these birds but there they were—a pair—much disturbed by our presence on the bit of alpine tundra that lay between the cabin and the lake.

While we were photographing the mountain, a beaver disturbed the placid lake surface, and a pair of green-winged teals paddled out of the reeds making miniature V-shaped wakes.

Ducks were present in the Park wherever there was water. They were not in great numbers, but in many little tundra pools we saw one or more broods of ducklings accompanied by their anxious mothers. Mallards, pintails, green-winged teals, greater scaups, old squaws, and American scoters were identified during the day and we visited only a small number of the lakes visible from the road. In this region mountains and plains alike are full of lakes, and after viewing the landscape from the air for a number of days one gets the impression that Alaska is a great aggregation of large and small bodies of water held together by a small but extremely necessary amount of land. In walking over the country through the springy masses of vegetation, into which one sinks from ankle to knee depth at every step, one gets just the opposite impression—it seems a long way between lakes.

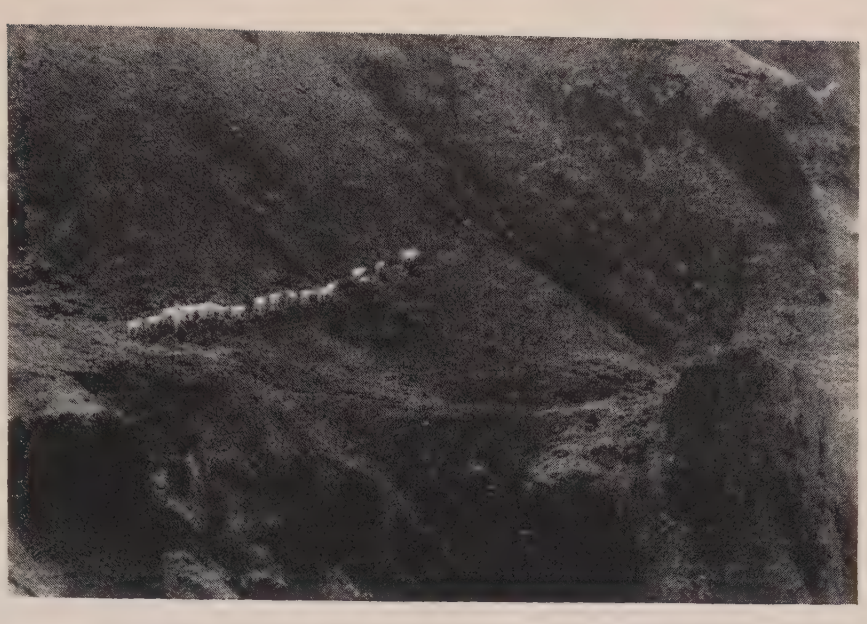
Unescapable, however, is the conclusion that Alaska is a much more important waterfowl nursery than has been assumed.

A BAND OF DALL SHEEP RESTING AT A "SAFETY ZONE"

These residents of Mt. McKinley National Park are being carefully studied today. Photograph by J. S. Dixon; Department of the Interior

A BAND OF DALL SHEEP MAKES ITS WAY ACROSS THE SLOPE

Here is a mixed string of twenty-three of these sure-footed mountaineers. Photograph by courtesy of the Department of the Interior



Travelling by airplane for four days over new country each day, and by boat and car and on foot for many days, whenever we got close enough to the water to see birds we saw ducks. The total number must be enormous, and Alaska certainly produces far more of the 85 percent of the North American duck crop that is reputed to be produced north of the United States, than apparently has been credited to it.

After leaving Wonder Lake we spent the day and until ten in the evening, going slowly back along the highway and examining the territory over which Murie and Glaser had been working. One little pond beside the road furnished a home for a brood of nine young ducks that seemed to have two mothers. Field glasses, however, revealed the truth. The real mother, a scaup, led the little fleet about, but a pintail hen just as consistently brought up in the rear. She appeared fully as anxious regarding the welfare of the brood as did the scaup. We supposed that she had had bad luck with her own brood and had done the best she could toward adopting another in compensation. This idea was strengthened by the appearance of a lone downy pintail to which none of the others paid the slightest attention.

The landscape along the highway was like that above timberline in the Cascade Mountains of Washington and Oregon. The depressions had a straggling growth of willows in which lived pileolated warblers, redpolls that conducted themselves as goldfinches do in more southern latitudes, Gambel's sparrows, and tree sparrows. Excepting the redpolls, these birds clung to a thicket, flying hastily to the next one only when forced to do so—showing much the same behavior as when wintering with us in the States.

There were many more berries than are commonly found in our western mountain parks, blueberries and crowberries being the most abundant, although several others were present. The crowberry in particular grew in great mats that were so covered with ripening fruits as to have a black appearance. All the birds were feasting on them, and I noticed here, as previously in other places, that the vines still held a goodly crop of dried berries from the preceding season. The birds in the Park seemed to be feeding exclusively on the fresh fruit, but earlier in the season the dried berries probably had furnished a plentiful supply of welcome food for residents and returning migrants alike.

Other plants present in profusion were a *Dryas*, which was spread over vast areas; a most charming little bellflower, *Campanula*; at least six species of rockfoils, *Saxifraga,* two of them old friends known in the Oregon Cascades; a very dwarfed *Aconite;* the mountain pink, *Silene acaulis,* much more liberally sprinkled with pink stars than

A WOLF PUP PICKS HIS WAY ACROSS A STREAM

An important study is being conducted of the relationships between the sheep and the wolves in Mt. McKinley National Park. Photograph by the author, made on his visit to Denali

it ever is in cultivation; a rattle weed, *Astragalus;* a spring beauty, *Claytonia,* much like that which blooms so freely in the woodlands of our eastern states; forget-me-nots, *Myosotis,* still unfolding blue flowers; a very dwarfed and lovely *Mertensia;* two gentians; and many others. Much of the tundra was overgrown with dense patches of semi-prostrate birch and willow—exasperating plants to walk through, yet seemingly always in one's chosen route.

Along the road wheatears, pipits, and horned larks mingled, and of these wheatears were the most abundant and conspicuous. On the telephone wires along the way the big northern shrikes swung in the wind just as do their smaller relatives farther south, keeping a sharp lookout for any desirable insect, bird, or mammal.

Along this same telephone line, another small and dashing raptor—the pigeon hawk—utilized the poles for perches; the eight I saw exceeded more than twice the greatest number of the species I had previously observed in a single day. Luckily I equalled it a few days later north of Fairbanks.

About half way back to the Park headquarters we stopped at Murie's cabin for lunch. Just before reaching his place a cross fox, rather shabby looking as most foxes are in summer, started across a bridge as we came to the other end. The fox saw us, turned, ran off the road and down to the stream, reversed, and again came onto the bridge even though the car was still there and I was sitting on the guard rail attempting to get his picture.

Murie had a wolf pup—one of five from a den that he had found—which he was keeping for the purpose of learning more of its habits and mannerisms. It was kept on a leash part of the time but often ran loose about the building and yard. At this age it was as curious as a puppy—following us about, with an inquisitive nose in everything.

After lunch, Murie and I climbed a nearby ridge hoping to get a look at some Dall's sheep that had been seen there. Adolph had been watching these and other sheep pretty closely as his major job was the study of the wolves and their effect on the bighorn population of the Park.

As we worked up the little valley chosen for the climb, our familiar friend, the robin, was one of the birds flushed from the berry patches. Rock ptarmigans, wandering tattlers, redpolls, and Gambel's sparrows were among the other species, but the "prize bird" was not a bird at all, but a big, black, female Alaskan wolf that jumped out of a patch of bushes not thirty yards ahead of us. It was my first close view of one of these magnificent beasts and it alone was worth the climb. The wolf trotted up the slope a short distance, and then turned to look at us—a performance she repeated at intervals until finally she passed from sight over a shoulder of the mountain high above us.

Resuming our climb, after watching the wolf, we soon reached the crest of the ridge. Sure enough there were the sheep, so we sat down out of the wind and with the glasses began to scan the slope below and the mountain wall and peaks across the canyon. First one group of bighorns and then another were located until seventy-five—mostly rams —were counted. One bunch of four was close, and a cautious walk a few hundred yards along the slope and a stalk down behind a little rock outcropping brought us within a hundred yards of them. We were beguiled by watching the sheep, and the next two hours passed all too quickly. First the four rams increased to seven, and, as the afternoon wore on, others appeared on the slopes until there were about twenty within easy observation. Some of these rams carried magnificent horns and all seemed in good condition.

I was somewhat in the predicament of a small boy at a three-ringed circus—for wherever I looked I missed something elsewhere. The sheep were all around, two wheatears were feeding among the rocks, sometimes within a few feet of my face, and I wanted to watch them all. When a black wolf appeared, perhaps the same previously seen, it complicated observation even more. The sheep saw the wolf instantly. In fact it was the turning of their heads that drew our attention to it, and every sheep on both slopes was watching it. They did not seem particularly afraid, but kept an eye on it. The wolf hunted busily in the valley but stopped frequently to look hungrily at some of the sheep. Occasionally it took a few steps towards a group as if estimating the chances of catching one by a quick dash. Each time, however, it decided against the attempt and moved on down the stream bed. Once when it disappeared behind a rocky point, two sheep feeding above trotted along the slope until they could again see into the bottom and resumed feeding. Other than looking at the wolf, this was the only sign of interest shown by any of the band.

The afternoon passed swiftly, and before we were aware we overran by nearly an hour the time limit we had set for activities on this particular area. Hastening back to the cabin we ate a quick dinner and started toward the Park headquarters. At nine that evening we had our last look at the mountain against the flaming western sky. The sunsets in Alaska last for long periods, and on days such as this one are as gloriously-colored as those found anywhere.

After our last look at Denali we drove slowly back to Park headquarters, seeing, on the way, the family of long-tailed jaegers, circling about with the gracefulness of terns, and numerous families of willow ptarmigans with from two to nine partially-grown youngsters.

It was late that evening when the final notes were written and the talk about the events of the day concluded. For me it will always remain a red-letter day—one that will stand out as sharp and clear as a perfect etching. The varied and changing views of Denali alone were more than enough to stamp the experience indelibly in the book of memories. Moreover, I had seen for the first time one species of bird, the wheatear, and two additional subspecies, the Kellogg's and the Alaska ptarmigans. It was also the first time that an opportunity had come to me to see living, downy, young old-squaws and juvenile plumaged Bohemian waxwings. My first big Alaskan wolf also had most accommodatingly "strutted her stuff" at close range, and I had enjoyed my first chance for close-up study of the beautiful white Dall's sheep. Add to that the unfamiliar alpine plants and the interesting combinations of old and new plant friends, and the sum was more than enough to make any naturalist long remember the day.

CALLING THE WILD

OJIBWAY DEER CALL

How men of the forest mimic its creatures

By ELLSWORTH JAEGER

IN THE fall, when we see the hunter hordes trudging off with duck decoys and calls, we are witnessing a re-enactment of countless ancient scenes for, since the dawn of history, man has used lures and decoys and calls to bring game close to his weapons. The men of the forest were then more able to mimic the voices of the wilderness than to speak the languages of their neighboring tribes, since these accomplishments often meant the difference between life and starvation.

Food in a primeval wilderness was not always easy to bag, and to get it man had to be a master of woodcraft. When little cover was available he might wear the skin of an animal and mimic the characteristic movements of the quarry. At times the primitive hunter resorted to tricks that aroused the animal's curiosity and lured it near. The Indians of the Great Plains had a man in each tribe known as the "buffalo caller". He would approach the herd with a buffalo robe draped over himself and would slowly entice the animals into a V-shaped chute that led to the edge of a cliff. When the buffalos were well within this trap, Indians who were hidden on both sides of the chute in the grass and brush arose, shouted and waved robes, stampeding the herd over the cliffs.

PENOBSCOT INDIAN WEARING HUNTING HOOD FOR STALKING

Antelope, too, had a sometimes fatal bump of curiosity. The Indian hunter crept as close as possible to the feeding animals and would then raise a stick to which a brilliantly-colored rag was fastened. When the curious pronghorns saw this unusual object waving in the breeze they would slowly approach to within range of the hunter's weapons. This was called "tolling antelope" by the old timers of the West. Theodore Roosevelt said that one could even attract these animals in the old days by simply lying down and kicking his legs in the air. Antelope today, however, seem to be too sophisticated for such common tricks.

When hunting waterfowl the early Indian peoples used decoys just as duck hunters do today. Some tribes made intricate models of rushes, cleverly braided into forms of ducks and geese. These they covered with waterfowl skins. In the North today, near Hudson's Bay, when the blue geese and snow geese fly southward, the Indians erect crude decoys of mud and reeds, covered with the feathers from birds saved from previous hunts. They also imitate the calls of the birds and are perfect in their mimicry.

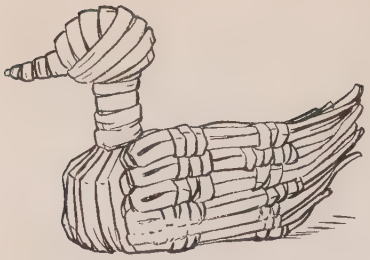
Imitating the voices of the wild folk was a necessary accomplishment for those who lived off the wilderness. It served in hunting, in forest warfare, and in signalling and communication. Animals not only respond to imitations of their own voices, but may come in answer to some other sound. Domestic animals especially have learned to answer man's voice or whistle. In the Middle West even hog-calling has developed into an "art".

A common forest art, still in use in the moose country, is that of moose-calling. This was first practiced by the Indians of the North centuries ago. Fortunately the betrayal of this lordly monarch can be done only in the fall mating season. At that time a bull moose may be lured close to the caller simply by singing like a cow moose in love. To do this a megaphone is needed, and one can easily be rolled into form from a piece of birchbark. Usually the Indian's moose-calling aid is about eighteen inches long. The mouthpiece opening is about three-quarters of an inch in diameter, and the larger end of the horn about five inches. This bark megaphone may be stitched together with spruce roots or watap.

In calling, strange to say, no two experts seem to sound alike and yet each may be equally effective in bringing a bull moose. The cow moose has a number of selections with which she plays upon the bull's emotions. A common song is a questioning call, that seems to ask "Where are you?", a sort of "Eeeeeeeeeeeee-OOOOOOOOOOOO-Yuh", beginning with a fine whining note, gathering volume and finally expelling an abrupt bellow at the end of the breath. When actually calling a bull moose the call may be repeated several times and then the horn is set aside for a while.

The Indians of the North draw out the first call for nearly half a minute. This is an amorous announcement to all bulls in the neighborhood. During the calling the bark megaphone is moved several times in the air in a circular motion ending with the mouth pointed down. If the bull is heard answering, another alluring cow song is given, and then a long interval of quiet. During the last calls, some Indians hold the megaphone only a few inches from a cleared space on the ground and add more of a squealing tone, which indicates moose passion.

When hunting by canoe the Indians glide silently along the shores, frequently calling with the megaphone pointed toward the forested banks. Should a bull answer, the bow paddler, who is also the "caller", takes a canoe bailer, or



DUCK DECOY MADE FROM RUSHES BY THE INDIANS

his megaphone, and dips up water and then pours it out to imitate a cow raising her dripping head from the water. From his hiding place in the brush the bull sees the shadowy bulk of the canoe and, hearing the splashing water, comes out into the open.

Another love song of the cow moose consists of a number of drawn-out whining notes, gradually gathering in volume until they end with a long bellow. The bull may answer with a characteristic grunt that can best be expressed in writing as "OO-wuh". Slashing the brush at times with an antler or sticks may also bring a bull. This is in imitation of the bull's habit of slashing the brush with his antlers as a challenge to any rivals in the field.

A moose-hunting charm that every Indian in the North is eager to find is the "little medicine moose", the peeto-mong-sons or "little moose in the big moose". This is a strange growth occasionally found in the skins of moose that looks as if it were composed of hair and hoofs. This is really the result of a dermoid cyst, a pocket in the skin, from which develop such products of the skin as hair, skin, teeth and nails. He who is lucky enough to find one believes that he has secured good moose hunting luck forever and that his moose calling will ever after be irresistible to the bulls.

PENOBSCOT MUSKRAT CALL

Like the moose, the jaguar is susceptible to love's sweet song. On the Pacific coast of Guerrero the natives often lure this big cat near by answering its call. To amplify their voices to simulate the big cat's call, they use a short wooden horn, repeating the cry at proper intervals. The jaguar's voice is usually a piercing roar, but in the mating season he changes his tune to a deep, hoarse "pu-pu-pu", repeated frequently. On occasion a hoarse cough-like "uh-uh-uh-uh" is heard over and over a dozen times. Sometimes the cat gives short throaty "uh-uh-uhs", increasing in rapidity and sound until, after a dozen or so, the final coughs become short, fearful roars. When courting, this feline gallant leaves his lair after sundown and follows the course of some canyon, roaring his love song as he goes in search of romance.

In the caribou country of the North, the old men still tell of calling the caribou as they do the moose, but today this way of hunting is never practiced. Among the Penobscots the Indian hunter often carried a bark horn, shorter and smaller than the moose type. This was only about nine inches long and about three inches in diameter at the mouth. As the hunter moved along the trail, he would give a few short, characteristic grunts. This, added to the crackling of twigs as he walked, sounded like a caribou on the move.

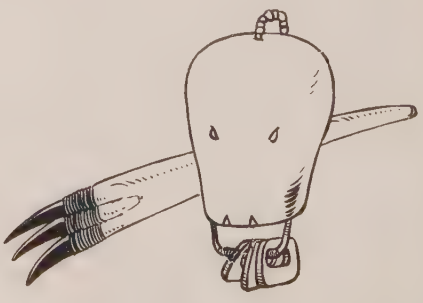
The characteristic vocal expression of the caribou, our American reindeer, is a grunt, usually a single or double grunt—when two are given closely together they sound like a double note. This is often a sort of questioning made by an animal outside the herd, or by a cow to her calf. Sometimes it appears to be group conversation, for when one or two animals begin it the others soon add their bit and a regular volley of grunts is heard. The first part of the caribou's double grunt is noisy and deep, as if it were given during the inhalation of a deep breath. The second part is something like a quick cough or bark. If these sounds are mimicked, the animals advance cautiously to satisfy their curiosity. At times a bull caribou makes a deep rumbling in his throat.

The Ojibway Indians, being a forest people, were experienced woodsmen and hunters. The animal ways were no mystery to them, and they were masters of the game trail, perfect stalkers and mimics of animal and bird voices. Although much of the animal calling is done with the Indian's voice alone, they also devised instruments to aid them. For calling deer they made an affair of soft wood carved into four hollow cone shapes that fitted into each other. A single beating reed was fastened at the smaller end of the middle section. When the sections were joined together there was enough room for the reed to vibrate. The hunter, blowing into the instrument, cupped his hands over the mouth, opening one hand as he sounded the call. A bleat like that of a fawn resulted. The Ojibways say that the does always respond to this bleating.

The Ojibways also used a hunting charm. When on a deer's trail they would smoke the powdered roots of the common New England aster and those of the bearberry, *Arctostaphylos uva-ursi*. The smoke of the aster roots, they say, resembles the odor of a deer's hoof, and it is not long before deer come toward the smoke, sniffing the air. There may be some truth to this, for deer have scent glands, located between the hoofs, that mark their trails with an odor.

Although deer are usually considered silent animals, they do have vocal expression. The fawn has a gentle bleat, and the doe, when calling her young, makes a sort of soft murmuring. When hurt she may bawl like a calf in pain. Everyone who has traveled in deer country has at some time been startled by the snort and shrill whistle of the buck. When disturbed in the night deer usually stamp with their feet, snort loudly, take a few bounds, and stamp again.

The woods Indians, like those of the plains, learned that



SCRAPER AND RATTLE USED BY ESKIMOS TO ATTRACT THE SEALS

many animals are inquisitive, and that appeal to this trait was a successful method of bringing them close. Beavers, for instance, can be attracted by rapping the gunwale of a canoe with a knife or paddle. A tap on a gunstock, or the "plunk" of a stone tossed into the pond, was also used by trappers to lure them from their lodges. Indians sometimes call beavers by hissing, or with a sound made by munching their lips. It may be that these sounds are in the beaver language.

THE FLORIDA "CRACKER" HAS DEVISED AN EFFECTIVE TURKEY CALL

Very young beavers cry like children. Occasionally the older ones make a chattering noise, or they may hiss or give a questioning "quer". The most common of their signals is the well known slap of warning made by the flat tail on the surface of the water. This is usually repeated by each beaver as he dives. Some woodsmen say that a wounded beaver dives without this characteristic splash.

Like the beaver, a muskrat also gives an alarm splash. It may also squeal loudly and snarl to show its displeasure. One of the most common of muskrat sounds, however, is a low squeak, a friendly call to its mate. This sound is often imitated by sucking the back of the hand to attract the animal.

Like other Indians, the Penobscots make artificial aids for calling animals. They have a name for their muskrat calls, "madé-kivé-sudi", which means "calling tube". Two small rectangular blocks of wood about three inches long are whittled into shape and mortised together. A sliver is cut away from the center, so that the breath can pass through, and a thin strip of birch bark is placed between the two wooden sections. When these are fitted together the bark strip becomes taut and vibrates as the hunter blows through it. A resonant buzzing is produced with this instrument. Almost the same sound is produced by drawing the lips tightly and sucking through one corner of the mouth in short jerks. These Maine Indians often paddled to a section where muskrats were plentiful and lured them close to their canoes with this call.

When on the hunting trail, the Penobscots wore "magic" hunting hoods. These served both as disguise and protection from the weather. They say it represents the "catowl", but it probably originated as an animal pelt, the animal's head being worn as the hunter's cap. A hunting hood of brown and red was worn when gunning for waterfowl; for deer slaying a gray hood.

The squeak of a mouse is magic to the ears of a fox and Indians often bring Reynard near to their blind by imitating this sound.

Crows will often respond to imitations of their calls, and anyone who has a flexible palate can mimic a crow. Their characteristic cawing can be reproduced by a human by saying "caw-caw-caw" in a high-pitched voice and vibrating the palate at the same time.

A good turkey call, made by a Florida "cracker", can be constructed of thin cigar-box wood. A small, rectangular box with edges of one end rounded is nailed together. Its dimensions should be about four inches wide, two inches high and about a half-inch in thickness. When the two curved edges of the box are drawn lightly over a small piece of slate, it makes a good imitation of a turkey call.

In the Arctic, Eskimo seal hunters often use sound effects to decoy seals. These animals are very curious and are easily attracted by unusual sounds, especially if gentle and continued. One method of securing seals is by trapping them in large meshed nets set under the ice in winter or in shoal waters along the shores in summer. The Eskimos lure them into these nets by gently whistling, rattling an ice pick or using a "seal scratcher", a fork-like instrument with three or four points made from the claws of the seal. This scratcher has a wooden handle and is gently scraped upon the ice. Some Eskimos use a caribou antler for this purpose, the sharp points of the antler taking the place of the seal claws.

Another Eskimo sound decoy is the seal rattle. This is crudely carved of soft wood into the shape of a symbolic seal's head. An iron staple is driven into the base of the head from which several ivory pieces dangle. The rattle is attached to a string and shaken upon the ice.

And so down the long, long trail from the misty beginnings man has pitted his craft and lore against creatures of the wild. Thus he survived by ingenuity and resource.

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Mont Blanc

By L. MOULTON

Mont Blanc, I see your blue and mystic eye,
Your noble forehead lifted to the sky.
You are the very symbol that I need,
Aspiring and yet humble, bound yet freed.
Serene in your exalted solitude,
You give out solace to a multitude.

UNIVERSITY PEAK TOWERS 13,585 FEET
At its feet lies Kearsarge Lakes, with the Kearsarge Pinnacles nearby. This country is dotted with lakes that sparkle against a backdrop of seemingly endless peaks

The "Second Yosemite"

On the trail in the new Kings Canyon National Park

By DOROTHY M. HILL

Photographs by Charles W. Hanks

"LET'S take a pack trip this summer?"

"I'd like to see the Kings Canyon National Park."

"Isn't a pack trip too big an undertaking just by ourselves?"

So the questions flew during the spring months as we spent our week-ends hiking over California's wildflower-covered hills. But when August came they were answered when we packed dunnage bags, sleeping bags and knapsacks and were off for the Sierra.

August is an ideal month for high Sierra trips, for then mosquitoes are relatively few and the weather is at its best. The new highway through the canyon of the South Fork of the Kings River ends at Zumwalt Meadows, in the very heart of this "second Yosemite", as John Muir called it. From there on you are on your own, to hike, ride, backpack, take burros or be packed in. Here the canyon is narrow, its floor wooded, the Kings River a rushing mountain stream. Sheer granite walls tower on both sides, and directly ahead, and the canyon comes to an abrupt end at the junction of lovely Paradise Valley and Bubbs Creek. The Sphinx and Grand Sentinel dominate the south wall, while the steep sides of Paradise Valley hide Mt. Starr King beyond. You feel tiny at the foot of these majestic cliffs. It is only when you get up into the higher country and look back down the canyon that it is possible fully to appreciate its beauty and size, or even to see the peaks in the background.

From the end of the road the hiker or camper has several routes from which to choose. We elected to head directly for the high country up Bubbs Creek, on to the John Muir Trail, over Glen Pass, through Rea Lakes, to Woods Creek

A MEETING ON THE GLEN PASS TRAIL IN KINGS CANYON PARK

A group of trail riders encounter some foot travellers who have packed in with burros. The beautiful Rea Lakes country lies just beyond the ridge shown in the background of this picture

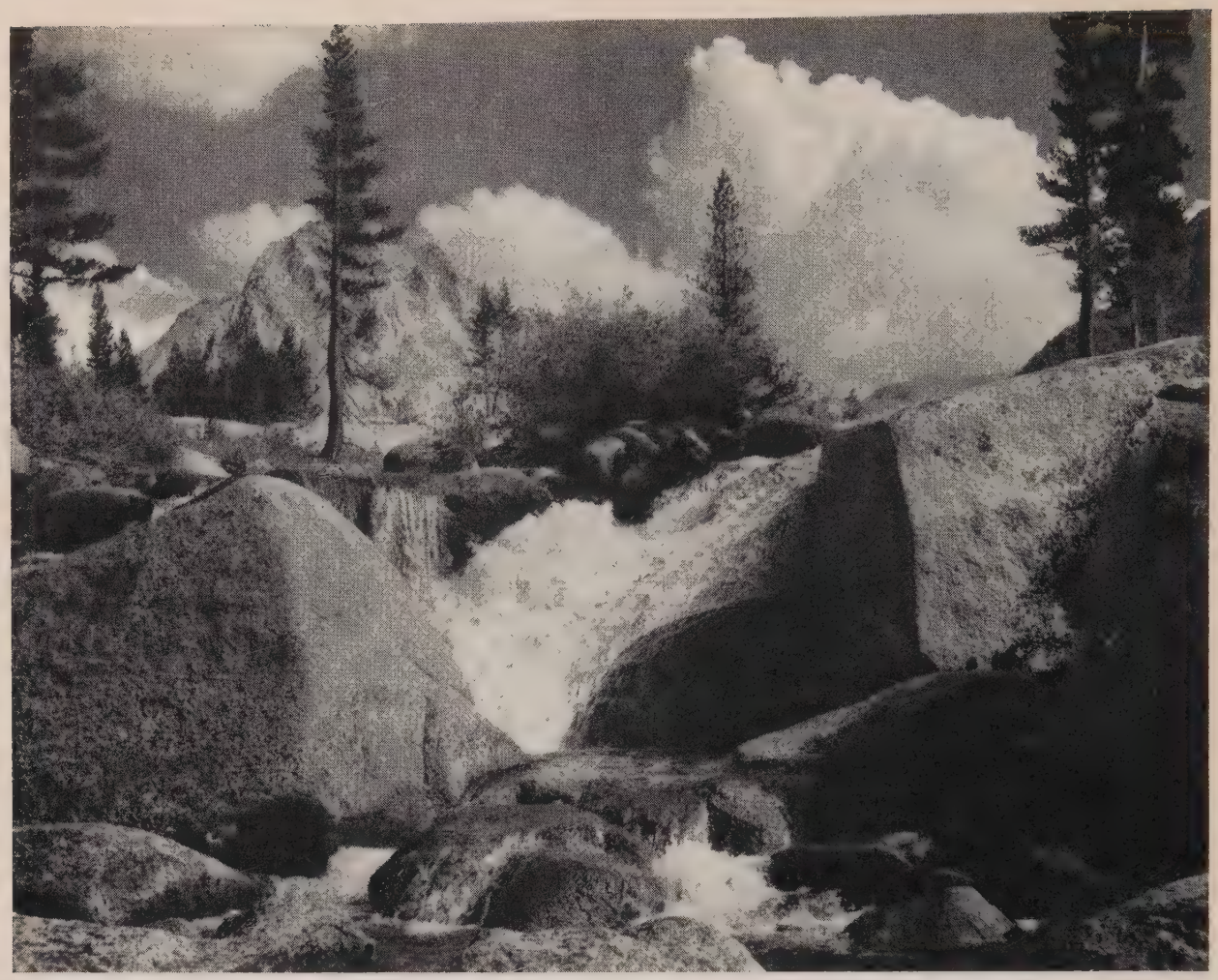
and down Paradise Valley to our starting point. This made a two weeks' trip, most of it through country above the 10,000 foot level, with time to stop over at East Lake and spend several days at Rea Lakes, as well as to climb Mt. Brewer and some of the other peaks along the way.

The trails through the Sierra are well marked, as are the topographical maps that are available. These trails are usually well-travelled and you meet pack trains, hikers and fishermen daily—but the mountains are big enough for everyone and there is a pleasant sense of comradeship in comparing notes on the country ahead or behind, trading some fish, perhaps, for a little sugar or coffee, then going on your way up the trail.

Our outfit for such a trip was simple: a first aid kit, set of nested pots, an aluminum grate, folding reflector oven, large cup and spoon apiece, a few tin plates, knives and such. Supplies were selected from the Sierra Club recommended "grub lists", with food chosen for variety and nourishment, but also in its uncooked and lightest form. Soups, goulashes of various kinds, biscuits, puddings, cookies, cakes, even a pie of sorts, were included in our proposed menus. Camp cookery has many possibilities, and an onion will render just about any concoction delicious in the mountains, regardless of what it started out to be!

Personal dunnage was limited to twenty-five pounds apiece, including sleeping bag, and was more than adequate. One does not need many clothes, and to wash them out in a stream or lake at the end of a long day on the trail —accompanied by a dip for yourself—is one of the hilarious institutions of such a trip. Our burros gave us some aggravating moments when, for example, they would shy away from a stream or refuse to budge except when persuaded by a well-aimed pine cone. They also gave us some of our most delightful times, when we would start out in the morning by ourselves to hunt for their elusive hiding places. In color burros blend perfectly with the rocks, and to an amateur their tracks look too much like a deer's. Whether following a burro's or a deer's track, it mattered little; eventually we would find the animals. Meantime, we would get away from the trails we had followed, discover new wildflowers still sparkling with the early dew, glimpse a coney, or watch an ouzel bow and preen itself. Somehow, then, it seemed as though "wild Nature fits into us as if truly part and parent of us"—to quote John Muir, who particularly loved this part of the Sierra.

The trail up Bubbs Creek is a delightful interlude before



BUBBS CREEK, ON THE LOWER EDGE OF THE UPPER BASIN
This is a typical high Sierra stream, clear and beautiful, making its way through the wilderness, rushing in small falls between great boulders that churn it into foam

reaching the bare granite country at the 10,000- to 13,000-foot levels. The trail switches back through the talus slope as you gain some thousand feet or so in elevation, then follows along the creek, which tumbles and dashes over huge rocks down the steep slope. Here there are masses of ferns, springy grass under foot and a glorious profusion of mountain wildflowers. A grove of towering pines and firs give an almost cathedral-like air to parts of the trail, in contrast to the pixieish quality of a tiny green meadow a mile or so ahead, through which a rivulet of a creek weaves among columbine, fireweed, gentian and Indian paint brush bright in the sunlight. In looking backward down the trail, the whole vista of the Kings Canyon is spread below, and as you rise higher the granite peaks beyond the headwalls come into view.

Our first camp was at the junction of Bubbs and Sphinx Creeks, in the shadow of the Sphinx and in a grove of sugar pines. Boughs for beds; deep pools in quiet eddies along the stream for baths; the comfortable, contented feeling one has after a hard day on the trail; a hot supper and the friendly comradeship around a huge fire as you swap stories and sing songs—these are some of the reasons why one goes back into the mountains again and again. Add to these the exhilaration of the thin mountain air, the hot sun and cool shade, the view over miles and miles of mountains or down deep valleys, the satisfaction of climbing some peak, and you are caught irresistibly by the lure of the high country.

Bubbs Creek eventually levels out into Upper Basin; a few miles below we took the trail to East Lake, where we made a base camp, explored Reflection Lake, and climbed Mt. Brewer. Reflection is a typical high Sierra lake—a clear, tiny, lovely basin surrounded by granite walls and talus slopes of huge boulders, acting as a shiny mirror for the surrounding jagged peaks, with a few scattered pines for a frame.

From the top of Mt. Brewer (13,570 feet) the vast panorama of the Kings-Kern Divide is spread out as though you were looking at a great, unreal high plateau of granite, carved by some great sculptor into sharp peaks and sheer valleys, with sides neatly scalloped by avalanches. Mount Whitney, highest point in the United States, is only a few hundred feet higher than Mt. Brewer, and is easily recognized on the skyline by its relatively flat top and sharp face. This divide marks the boundaries between the Kings and Sequoia Parks, and is typical of this granite country above the timberline in both Parks.

From Mt. Brewer and East Lake we went back to join

GROUSE MEADOW IN LE CONTE CANYON—A BIT OF PARADISE

This is the Middle Fork of the Kings River. This meadow is considered to be one of the most beautiful of the many that one finds in wanderings in the high country of the Sierra

the John Muir Trail, which led up over Glen Pass, a steep winding trail through the talus and over a "pass" we thought just about high enough to warrant being called a mountain all by itself. The country ahead was dotted with beautiful lakes with a backdrop of a seemingly endless number of peaks, most of them more than 13,000 feet in elevation. Rea Lakes, Bull Frog Lake, Dragon Lake, University Peak—with Kearsarge Lakes at its feet and Kearsarge Pinnacles nearby—Fin Dome, Dragon Peak, Mt. Starr King, Mt. Rixford—with the Thousand Lakes Basin and more mountain ranges beyond—all this was a paradise for campers, fishermen, rock-climbers, or just those who love the outdoor wilderness. There was adequate feed for the animals everywhere, and although the country was sparsely-wooded just at timberline, there were some beautiful gnarled old pines near the lakes that had been hardy enough to withstand the altitude and the storms.

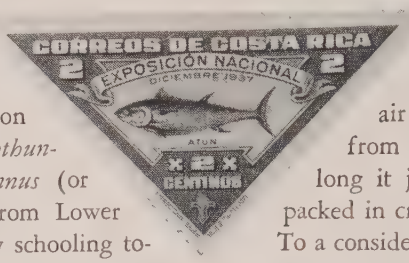
These lakes were such as John Muir must have had in mind when he said: "The cleanliness of the ground suggests Nature taking pains like a housewife; the rock pavements seem as if carefully swept and polished every day". Here, too, was the country Nature lovers have feared will lose its primitive beauty as the regions are made more accessible to pack trains of pseudo-mountaineers. To those who really love the mountains, the beauty of the lakes and streams and trails cries aloud at any carelessly-kept campsite. You feel that you want to leave no more of an imprint of man's passing than does a bear, or ouzel, or coney. It is to be hoped that the grandeur of the Kings Canyon National Park country will be its own protection against such intrusions. No roads will be built through it, and although the trails are excellent and the Park boundaries are readily reached by automobile from Zumwalt Meadow, or from Bishop and other points to the North, it takes a couple of days to pack in to these high lakes and peaks. The effort required to reach this back country may deter many not genuinely interested in enjoying the mountains, but for those who do go in, this country is a grand reward to find at the end of the trail.

We left Rea Lakes reluctantly, headed along the John Muir Trail to Woods Creek, then on to Paradise Valley, dropping down through a gradually deepening canyon, through green meadows and more and more trees. The steep canyon walls rose above us again, blotting out the peaks we had been exploring. All too soon we were down to Junction Meadow, where the Kings River makes a sharp turn to the right, going into the Kings Canyon proper.

Tuna Fishing

By EDITH M. LAING

BECAUSE of its proximity to the most productive tuna fishing grounds on the Pacific Coast, and its situation on the Gulf of Nicoya, which ranks next to Magdalena Bay for abundance of bait, Puntarenas, Costa Rica, has long been the most important port of call for the California high seas tuna fleet. Quite fittingly, therefore, Costa Rica recognizes the tuna on one of its National Exposition series of postage stamps.



The tunas belong to the mackerel family. High seas fishing is dependant on the two species known as yellowfin, *Neothunnus macropterus,* and skipjack, *Euthynnus* (or *Katsuwonus*) *pelamis*. These range from Lower California to the Galapagos, frequently schooling together. Yellowfin, which is marketed as light-meat tuna, commands the highest price. A live yellowfin is a metallic dark blue above, shading into iron-gray beneath. Skipjack, sometimes called striped tuna, is light blue and silver, with dark horizontal stripes along the lower sides.

In search of these fish, special Diesel-powered tuna boats travel fully 3000 miles from their home ports of San Diego and San Pedro, usually being gone two months at a time. Their hard-won catches are converted into some three million cases of canned tuna a year.

When a school of tuna is sighted, sardines, anchovies, or anchovettas from the live-bait tanks are thrown out to attract the fishes to the boat. This is called "chumming". Meanwhile narrow racks are hastily let down along the outside of the boat, and on these the fishermen take their places, each with his bamboo pole. This arduous and dangerous method of fishing is performed singly, in pairs, or in threes, according to the general size of the fish running. For the difficult task of casting and landing by two and three pole lines, perfect coordination is necessary by the team, each member of which wields a pole attached to a common line.

On each barbless hook is affixed either a live bait, or a lure of white chicken feathers to which the hungry tuna rushes. In a flash, its own terrific momentum and the fisherman's precise timing whisk it up through the air over the fisherman's shoulder, to fall from the barbless hook to the deck. Before long it joins its fellows in the hold carefully packed in crushed ice, or in chilled sea water.

To a considerably lesser degree two other species of tuna concern the canning industry—albacore, *Germo alalunga,* and bluefin, *Thunnus thynnus*. The highly-prized albacore is the most elusive. Once plentiful from Puget Sound to Lower California, it has become very scarce. In contrast to the other species, its pectoral fins are unusually long. Bluefin, a beautiful iridescent deep blue and silver fish, found from Oregon to Guadeloupe Island, is caught entirely by purse seining.

Most of the tuna fishermen are Portuguese, Japanese and Italian. Many a school boy in search of an adventurous trip has managed to get work on a tuna clipper. Even though he finds that fishing is not all romance, he inevitably has returned with toughened muscles, a profound admiration for the hardy breed of men who harvest the seas, exciting tales of porpoises, sharks and giant rays, and a new-found respect for the humble but highly nutritious can of tuna. His education has been enlarged.

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Cardinal Companions

By FRANK SOUTHARD

IT was the summer that I was thirteen that I went to visit my grandparents in the country and became the foster parent of a pair of cardinals. Walking through the woods one day, I was attracted by a commotion, which turned out to be a black snake with a cardinal in its grasp. Before I could interfere, the bird was dead, but a careful hunt around revealed a nest containing two small birds. I carefully carried them home and for six months fed them, by hand, a mixture of boiled potato, hard-boiled egg yolk and bird biscuit.

It was surprising how they thrived on this diet.

Two birds—brother and sister—are now more than two and one-half years old. Since they have known nothing of the wild it has seemed unwise to turn them out to fend for themselves, but they have much freedom, and seem happy. The female is gentle and does not mind being handled, eating out of my hand and delighting to perch on my head or shoulder. Her brother is gentle but does not enjoy being handled. Both are very beautiful and satisfactory pets.

The Story of a Highway

U. S. Route No. 1 is a sad example in exploitation and an indication of the need for zoning

By ELIZABETH B. AND WALTER L. LAWTON

No highway in the United States is so closely connected with the early history of our country as U.S. Route No. 1. An interesting sketch released by the Federal Road Bureau some years ago calls attention to the fact that the connecting sections of the Atlantic Coast Highway, now known as U.S. Route No. 1, have formed a "highway of history for over three hundred years. Washington traveled it repeatedly in peace and war. It connects New York, Princeton and Philadelphia, the three cities at which the capital was established in the early years of the Republic, with Washington, the final choice. It passes through or near most of the revolutionary battlefields and many of those of the Civil War."

As early as 1636 this road existed as a blazed trail connecting the early Colonial settlements. Soon crude bridges spanned the deeper ravines, fords were located on narrow streams and canoe ferries crossed the wider rivers. As intercourse grew between the settlements, and as the cart and the stagecoach made their appearance, the trail became a wagon road, the road was widened, low places were corduroyed and surfaces of stone and gravel were sometimes added.

Toward the close of the 17th century travel by horseback and pack horse was common between Boston, New York and Philadelphia. The first coaches appeared in the streets of Boston in 1687 and "were severely frowned upon by that Puritan community for their luxury". Regular stage service for passengers was inaugurated over U.S. 1 between New York and Philadelphia in 1732, and made the trip, we are told, in five days. But "having had a taste of speed, the good colonists were not satisfied, and efforts were made to reduce the time, culminating in 1771 with the introduction of the 'Flying Machine', an ornate and brilliantly-colored coach that negotiated the distance of a hundred miles in two days. Then, and then only, did the speed-mad tourists of the day feel that they had reached the acme of perfection in inter-city travel." By 1802 stagecoaches were operated regularly on Route No. 1 from Boston to Savannah, making the entire journey of 1200 miles at an average speed of 53 miles per day for the low fare of $70.

U. S. ROUTE 1 AS IT MAY HAVE APPEARED IN THE DAYS OF THE STAGECOACH TWO HUNDRED YEARS AGO

Then came the turnpikes, private initiative meeting the demand for better roads, and many sections of Route 1 were thus improved. But turnpikes proved to be unprofitable, and when the railroads came most of them ceased to operate. The railroads, the Federal Bureau states, ushered in the "dark ages" of highway travel. Route No. 1 connecting all the points at which the earliest railroad experiments were made "could not compete with . . . its steam-powered adversary and fell into general disuse and almost complete decay for well upon seventy years. When finally the bicycle, the automobile and the motor truck came to give new facility to highway travel and transportation, Route No. 1 was one of the first to feel the new tingle of life . . . and to benefit from the scientific methods introduced."

Fourteen years ago, because this route connected the great industrial cities of the Atlantic seaboard and carried the heavy tourist traffic to the summer resorts of New England and the winter resorts of the South, and because of its strategic value as a military road in time of war, the Federal Bureau of Roads declared it to be "the most important road, everything considered, in the United States". With the many new routes now open, U.S. 1 is still, and for the same reasons, one of our most important highways. But it is not the same highway. Tremendous changes have taken place both in the roadbed and along the road margins. Traffic capacity, speed and safety have been

HIGHWAY ZONING CAN PREVENT THESE UNSIGHTLY ROADSIDE SLUMS

vastly increased by costly improvements of the roadbed, but the same capacity, speed and safety have again been seriously diminished by the unrestricted commercial development along the roadsides.

Today, when the military value of our roads is a vital matter, we discover that many of our through highways, including long stretches of U.S. 1, cannot be reconstructed effectively for military purposes. It would be too costly to acquire the necessary width, solely due to the fact that the margins of these through highways have been usurped by roadside business which should never have been allowed to locate there.

Many miles of our arteries today are closely hemmed in (1) by filling stations, camps, hotels and garages—all types of business needed by the traveler, it is true, but business that should have been segregated at reasonable intervals and kept well back from the road: and (2) by innumerable signs, posterboards, palmists' tents, dance halls, skating rinks, china animal sales, wrapper and counterpane displays, and scores of other businesses that have no rightfull place whatever along rural roads, but should be confined to the towns.

This unrestricted marginal development is illustrated to the *n*th degree on U.S. Route No. 1. In early days the stage coach traveler on this historic road could enjoy the characteristic beauty of each region. The modern automobile traveler has no such opportunity. The background of the highway pictures may vary from state to state, but the foreground, which is the dominating factor in any scene, is ever the same, an interminable monotony of signs, billboards and ugly roadside slums, a veritable nightmare to the pleasure-seeking motorist. No need to describe it. The rotogravure pages that complete this article present the irrefutable camera evidence.

Esthetics are not the main consideration. Safety and efficiency are seriously menaced by this constant distraction of attention and by the induced cutting in and out of the flow of traffic. Highway engineers in every state will testify that their heavily-traveled arteries, often within a very brief period, depreciate fifty percent in efficiency because of unrestricted marginal development. The Massachusetts Planning Board quotes the estimate of traffic engineers that approximately one-fifth of all highway accidents are due in part to roadside commercial development. Studies made by the Maryland Legislative Council indicate that the accident ratio is almost twice as great along highway stretches with heavy roadside development.

HOW CAN STATES CONTROL ROADSIDES?

Because the rural billboard is usually the first and often the worst offender, the early efforts toward roadside control have been state billboard laws. Along U.S.1 six states have such laws, Maine, Massachusetts, Connecticut, New Jersey, Maryland and Virginia. Yet, the average motorist passing through these states would be unaware of any marked degree of control. To the casual observer, in all of them, the rural billboard is still rampant. However, these state laws have effected certain real gains and point to certain definite conclusions, which should not be ignored.

An annual permit fee for each sign, even as low as fifty cents (Virginia's minimum) will clear tack signs from trees and abolish some of the small signboards. A minimum fee of $1 (Maryland) will eliminate more signs and the same fee plus a setback of fifty feet from the pavement (Maine) produces still better results. A fee of $3 (Connecticut's minimum) eliminates most of the small boards, and the Massachusetts fee of $4 plus a setback of fifty feet from the right-of-way, banishes them entirely, exclusive of those connected with roadside business.

On the large billboards, however, none of these fees have had any material effect. Maine's maximum fee of $5 for boards from 600 to 900 square feet in area, and Connecticut's maximum of $9 for signs of the same size, have been powerless to check a constant increase. Even New Jersey's tax of three cents per square foot, only partially enforced, leaves that state blanketed by the large boards.

As to the efficiency of setbacks, fifteen feet from the right-of-way (Connecticut), or even fifty feet from the near edge of the traveled way (Maine) are insufficient to check the large boards or materially to lessen their menace to safety. But a setback of 100 to 300 feet from the right-of-way, requiring the single poster panel to go back 100 feet, and the painted bulletin 300 feet (Massachusetts), does greatly reduce the number and safety menace of the large billboards. This demonstration is not seen throughout Massachusetts because interpretation and enforcement of the regulations have been largely influenced by the bill-

HIGHWAY ZONING CAN FORBID BILLBOARDS OUTSIDE OF COMMERCIAL ZONES

board industry, but, where the law has been carried out, the proof is unmistakable. These setbacks have been upheld by the Massachusetts Supreme Court. Massachusetts also demonstrates that the State can prohibit signs on roads of unusual scenic beauty.

The possibility of regulating the number and size of signs on the roadside business places is demonstrated in Maine, the only state yet to adopt such a regulation. In spite of the too generous limit provided—ten signs with total area not over 250 square feet—the administrator by combining tactful education with enforcement, has noticeably improved Maine's roadside stands, which now average cleaner than those in most states.

To exempt from tax or regulation all signs on the place of business *or within 500 feet of it,* provided these signs advertise goods produced *or sold* on the premises (as in Virginia) creates a free billboard zone 1000 feet long wherever there is a roadside stand of any description.

By far the most important lessons pointed out by these state laws are (1) that none of them restrict signs to commercial districts, the ultimate goal of billboard regulation, and (2) none effect any control over roadside business in general.

HIGHWAY ZONING NEEDED

Our great need is regulation that will segregate not only billboards but all roadside business in certain areas, leaving the greater part of our rural highways unspoiled; their efficiency, safety and recreational value unimpaired. Parkways, freeways and highway zoning are the methods which can best achieve these ends, but parkways and freeways are too costly for common use. Any practical solution of the roadside problem must apply to the great mileage of roads and highways of the ordinary type. Highway zoning appears to be that solution.

When first advocated, more than ten years ago, by Albert S. Bard, counsel for the National Roadside Council, highway zoning was ridiculed as "strip zoning" and was rejected by the "orthodox" zoners and planners. Today they have accepted it as the logical solution of the roadside control problem. Highway zoning is now endorsed by the Federal Public Roads Administration, the American Association of State Highway Officials, the Highway Research Board, the National Association of Real Estate Boards and the American Automobile Association.

Several state highway zoning bills have been proposed, by far the most complete being the Bettman Act, drafted by Alfred Bettman, attorney for the American Society of Planning Officials. The American Automobile Association at its annual meeting, November 1940, unanimously adopted a highway zoning legislative guide, prepared by Hugh R. Pomeroy, Director of the Virginia State Planning Board, and based on the Bettman Act. This guide, which now becomes the zoning policy of the American Automobile Association, to be promoted by them through their state associations, advocates roadside zoning in non-urban areas with three main objectives: (1) to confine roadside commercial uses to designated commercial districts: (2) to require that roadside buildings be set back from highway right-of-way lines: (3) to establish control over the appearance of roadside commercial buildings, including limitation of their display of signs.

Rural commercial zones are not to be open to all forms of business. The American Automobile Association stresses the recognition of two types of roadside business districts —the "roadside service" type, located along the open highway apart from communities, and the "general commercial" type, located on the highway adjacent to a community. The roadside service district, which must be provided even on the most scenic roads, exists solely to meet the needs of the traveler—gas, food, lodging—and should be limited to these uses that directly serve the traffic. Many types of business would be excluded from this district, including "the automobile wrecking yard, which is essentially an industrial use, and the billboard, which is not a service type of use, but an intrusive use". On the other hand, the " 'general commercial' or 'community center' type of business district serves not only the traffic on the highway but an adjacent community as well . . . and can properly be open to all kinds of business, including outdoor advertising".

No State has yet tried highway zoning, although several state zoning bills were introduced in 1940 and again in 1941. However, highway zoning has successfully demonstrated in several counties—mostly in California—its ability to segregate roadside business, to establish setbacks and to control to some extent the architecture and appearance of roadside business places.

The only example of county zoning occurring on U.S. 1 is in Arlington County, Virginia. Compare the control here established over outdoor advertising with that secured by the license and permit laws already mentioned. In Arlington County billboards are permitted in only the general business and the industrial districts. In the general business district no board may be erected within 200 feet of any type of dwelling. All boards, even in industrial districts, must set back forty feet from all street lines. These billboard regulations are retroactive and all non-conforming boards were required to move within ninety days. Of the 108 billboards in the county, more than half were in residential and rural zones and were promptly removed.

Signs on the place of business are also controlled. At least two-thirds of each such sign must advertise the dealer, with not over one-third advertising the product. This rule is also retroactive and some 3000 of these "signs at the point of sale" have been removed.

ATTITUDE OF THE BILLBOARD INDUSTRY

The billboard industry publicly asserts that it favors highway zoning, provided it is "non-discriminatory" and is approved by the majority of property and business owners in the area affected. "Non-discriminatory" zoning means, they explain, that billboards must be admitted wherever business of any kind whatever is allowed. Every gas station, essential even on the most scenic roads, must be flanked by billboards if the industry so chooses. As to the approval of property owners, the industry is taking care of that item by organizing a national Highway Property Owners' Association with the express purpose of fighting all billboard legislation.

For, whatever its public assertions may be, privately the industry is fully organized to fight any and all billboard bills, particularly highway zoning bills. The American Highway Sign Company, the National Sign Association, and the powerful Outdoor Advertising Association of America, have created a Joint Defense Committee, we are told, for this purpose. When a billboard bill comes up in any state, thousands of letters urging a vigorous protest to the legislators, go out to every lessor of these companies in that state, to the farmers who rent land for signs and to the manufacturers who lease sign space. The Petroleum Industry and the Brewers Association, we are informed, are also notified and are expected to call out similar protests from their thousands of local members. In short, the legislators are to be flooded with letters from thousands of property owners and business concerns, not spontaneous letters but all inspired by the billboard industry.

COOPERATION WITH BILLBOARD INDUSTRY

A second weapon with which the industry fights billboard laws is their old favorite game of cooperation. It would be cheaper and safer for the industry if legislative battles could be avoided by a limited degree of compromise. Hence, the cooperative scheme under way in Pennsylvania, the true purpose being, as the industry privately admits, to head off regulatory legislation in the 1941 session.

Past experience has proved the futility of any attempted cooperation with the billboard companies. Such attempts have invariably played the game of the industry by quieting agitation, tying the hands of those seeking billboard control, and postponing legislation.

The Pennsylvania cooperative project may bring immediate relief in certain districts, but if this gain is won at the cost of state-wide relief through legislation the price will be high indeed. Evidently the Pennsylvania Roadside Council realizes that any gains to be statewide and permanent must come through state laws. The Council, while a member of the "Cooperative Committee", continues unabated its efforts to secure state-wide highway zoning legislation.

THE SITUATION ACUTE

The need of roadside control was never so acute as today. In every state billboards and roadside commerce are increasing at an alarming rate. In Florida, for example, on one hundred fifty miles of U.S. 1, the large billboards have increased twenty per cent within the last year. Moreover, we face today a period of exceptionally heavy road building, the construction of new roads and reconstruction of old roads for military purposes. These roads too will be seized upon by billboards and roadside business, and their vital capacity, speed and safety rapidly reduced, unless protection is provided. Will the States awaken in time?

HIGHWAY ZONING CAN CONTROL THE ARCHITECTURE AND SIGN DISPLAY ON RURAL BUSINESS

If motoring for pleasure from Bar Harbor to Miami, drink your fill of beauty at Bar Harbor. Opportunities beyond are few and far between.

A MOTORIST'S VIEW—
U. S. ROUTE 1 FROM MAINE TO FLORIDA

Some stretches remain unspoiled, it is true, particularly in "down-East" Maine where travel is comparatively light and towns are small. But even here, in most picturesque territory, the huge billboards blot the scenery in ever growing numbers, an increase of thirty per cent since 1934.

From Portland south to Kittery billboards and roadside business dominate the rural stretches. The characteristic beauty of Maine is obliterated by 224 billboards, 64 signboards and 244 commercial establishments. Billboards have increased on this road 54 per cent since 1934, in spite of Maine's sign law, but small signboards have diminished 84 per cent and signs on roadside stands are noticeably less. Even so, the grand total of signs of all sorts averages 45 to the mile.

HOW MUCH CAN YOU SEE OF MAINE?

U. S. 1 is no cleaner as you cross from Maine into New Hampshire. From Portsmouth to the Massachusetts line conditions grow worse. Three more billboards and eight more signboards to the mile appear, and the roadside stands are more unsightly with advertising. It is evident that Maine's sign regulations, while not very strong, have given that state an advantage over New Hampshire, which has no sign law. The scenery along the New Hampshire coast is naturally attractive but is ruined by the ubiquitous billboard placed as we see it pictured.

Not long after you enter Massachusetts, U. S. 1 becomes the Newburyport Pike, the north approach to the City of Boston. Recently widened and improved, part of the way with divided traffic, much of this highway would resemble a parkway if roadsides were controlled and business segregated. Only a few towns along the route have made any real effort to protect the Pike by zoning. Scattered along one three-mile stretch, through the town of Saugus, there are already 46 commercial establishments and twelve billboards, close to the road.

Massachusetts requires large billboards to set back 300 feet from the right-of-way unless located in districts "of a business character." The Outdoor Advertising Division ruled that one business place within 300 feet rendered the district commercial. Their measure is an elastic one. The boards shown above, like others on the Pike, stand close to the pavement, their position "legalized" by the one small shack to the right, which stands some 400 feet away. Unless this definition of "business district" is changed, the Newburyport Pike will rival in ugliness the notorious Baltimore-Washington Boulevard.

Elsewhere in Massachusetts, the required setbacks, which have been ignored on the Pike, have proved their power to reduce the number of billboards and to lessen their menace to safety. The setback entirely prevents the telescoping effect illustrated in the New Hampshire picture at the top of the page.

From Boston to Providence, on through Rhode Island to Westerly, and through Connecticut to New London, U. S. 1 lies largely in undeveloped territory. Most of the route is not yet lined with billboards and commerce, it is only blotched. One can still catch enchanting glimpses of New England between the blotches.

From New London to New Haven the blight increases. Billboards on this road have multiplied 43 per cent in seven years. From New Haven west they have increased 38 per cent and the roadsides are constantly and heavily commercialized.

East of the New York line, a sixteen-mile stretch outside of towns is crowded with 189 billboards, 63 signboards and 194 commercial establishments. Including signs on business places, the appalling total is more than 1800 signs, 112 to the mile—more than one sign per second, if you travel fifty miles per hour, and one business place every six seconds.

Can recreation or even safe transportation exist under such conditions?

Connecticut's answer to this question is the Merritt Parkway, which parallels U. S. 1 from New Haven west and provides complete relief from its congestion and horrors. The Merritt Parkway leads into the Westchester County and Hendrik Hudson Parkways of New York State, by which the southbound motorist avoids the congestion of U. S. Route 1 in New York and picks up the route at the George Washington Bridge and the New Jersey line.

For twenty-seven miles in New Jersey, U. S. 1—here the superhighway—runs through suburban areas with roadsides largely industrial, and over the elevated Pulaski Skyway where no roadsides exist. Not until Rahway does it enter open country. From here, for eight miles south, the highway is crowded with business and advertising, seeking to profit by the great stream of traffic. Conditions improve below New Brunswick, but the general average from Rahway to Trenton is ten billboards, 4.5 signboards and six business places to the mile.

Property owners who refuse to rent to commerce have kept a few spots clean. Two stretches of from one to two miles each are entirely free from advertising and business, and illustrate the dignity and amenity that this great artery could offer with divided construction and business segregated by roadside control.

Pennsylvania offers the weary motorist no relief from the monotonous scenery. On rural U. S. 1 north of Philadelphia, an even closer procession of stands, signs and billboards flashes by—70 signs for each 70 seconds, at fifty miles per hour. South of Philadelphia the average finally drops. Only two business places now, with a total of 26 signs to the mile, and you catch an occasional unblotted view of the characteristic rolling farmlands and picturesque stone houses of the Quaker State.

THE DISGRACEFUL APPROACH TO OUR NATIONAL CAPITAL

The Baltimore-Washington Boulevard—the motorist's nightmare—has 618 business places and 2450 signs on 28.5 miles. To each mile are 21.7 commercial stands and 85.7 signs and billboards. Dignity and amenity are completely destroyed; safety is seriously menaced.

"It is obvious that . . . every commercial establishment, every point of ingress or egress is a potential zone of friction and congestion: each unit of roadside development invites a possible interruption to the smoothly and swiftly moving flow of traffic on the main roadway." *Roadside Control*, Maryland Legislative Council.

COURTESY PUBLIC ROADS ADMINISTRATION

APPROACH TO WASHINGTON BY THE MOUNT VERNON MEMORIAL HIGHWAY

The Memorial Highway is today the only dignified and fitting approach to the beautiful City of Washington. It connects Mount Vernon and the Capital City by a picturesque route along the Potomac River and across the Arlington Memorial Bridge.

SOUTH APPROACH TO WASHINGTON BY U. S. 1

This is the historic "King's Highway", established by law prior to 1700, the highway on which, we are told, Thomas Jefferson could make no better speed than three miles an hour, and the mail required from sunup to sundown to reach Fredericksburg. Today the average speed is fifty miles an hour, concrete has covered the mud, bridges have replaced the fords, and *billboards have obliterated Virginia.*

NO HIGHWAY IS SAFE FROM THIS ABUSE

In Virginia religious signs and tree signs, so numerous a few years ago, and many small signboards, have been eliminated by a well-enforced sign law. The permit fee is too low to affect the large boards, and there is no limit to signs on the places of business.

Motor on into the Carolinas and Georgia, where there are no sign laws. Small signboards increase. Tree signs and religious signs reappear, a few in North Carolina, more in South Carolina and a host in Georgia, where they rival the pecan signs that flood that state. One town has 18 large pecan boards on one approach.

Auto dumps appear more often as you proceed south. A particularly hideous one crowns the hilltop on the immediate approach to Augusta, Ga. The tobacco barns stand in the cotton and tobacco fields like "patch-work" billboards, each covered with multi-colored tack signs, and are characteristic of these tobacco states. Large billboards number slightly less in these three states, except near the cities. The tourist town of Aiken, S. C., has twenty-five large billboards and sixty-two signs on one three-mile approach. Waycross, Ga., in a similar distance has thirty billboards, ninety signs and four auto dumps.

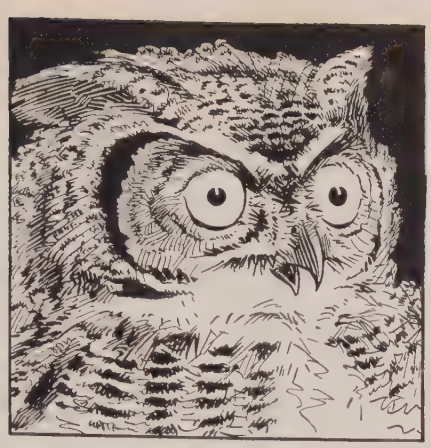
There are sections of U. S. 1 in Florida, along the Halifax and Indian rivers and the Atlantic Ocean, which could be the most beautiful sections of the entire route if they were protected.

But Florida, the state that would gain the most from beautiful highways, has no roadside control. From Jacksonville to Miami there are more billboards, more signs and more commercial enterprises of all sorts, than on an equal mileage of U. S. 1 in any other state. There are, outside of towns, more than 1000 billboards, 6000 signboards and some 14,000 signs on trees and business places—an average of one sign per second on a trip of 300 miles. Conditions grow worse daily. Signs and billboards on Florida U. S. 1 have doubled in six years.

The ten miles of new right-of-way north of Jacksonville, on November first, 1940, just fifteen months after it was opened to travel, showed 42 billboards, 78 signs and 9 business places, with five more building.

When the long and monotonous journey from Bar Harbor to Miami is ended, how much has the traveler seen of our eastern coast? What recreation of body or spirit has the natural beauty of these 1800 miles brought to him? It is true, cleaner routes do exist today, but tomorrow these routes also will cover the landscape with signs and the roadsides with ribbon slums.

If we would save our countryside from this abomination and protect our costly highways from this menace, we must act now, before the damage is irreparable. Each state should develop the will and to each must be given the power to control its roadsides.

As We  See It

DANGEROUS GAMBLING

Before many weeks have passed the 1941 regulations governing the shooting of migratory waterfowl will be announced. This is a matter of interest to two major groups —the 1,100,000 hunters, to whom the ducks and geese represent targets and sport, and to the numerically greater group whose interest is in the birds themselves and in the preservation of reasonable numbers of *all* species. Our sympathy is with the latter viewpoint.

It had been our intention, as usual, to express our views as to the year's situation and our hopes as to the prospective regulations, which will be recommended by the Fish and Wildlife Service and—approved or amended—announced by the Secretary of the Interior. There comes to hand this year, however, a leaflet entitled "Gambling with the Ducks", issued by the Emergency Conservation Committee, New York City. This publication so well presents the facts that it seems appropriate to review and endorse its sentiments, and to let this, with some additional observations, stand as our own editorial attitude.

"The only safety for the waterfowl is to insure a sufficient breeding stock," says the introductory sentence in this leaflet. This is a statement that is self-evident. "But," the statement continues, "for several years the federal authorities in charge of waterfowl protection have been trusting to luck in the weather—good weather for the birds, bad weather for the hunters—to avert the disaster of excessive shooting before the breeding-stock is built up to a safe level."

Weather favored the birds in 1938 and 1939, and the regulations were correspondingly relaxed in 1939 and 1940. In the year just past a sixty-day season was allowed in three zones from north to south, in effect a three-month season. In the East, and, after the start of the season, in the middle West, the weather favored the ducks. On the Pacific Coast the weather man was on the side of the hunters and the kill was alarmingly high. Had comparable conditions prevailed in the upper Mississippi Valley, with its tremendous concentration of hunters, the kill would have been a calamity.

Under Dr. Ira N. Gabrielson, the Fish and Wildlife Service has sought to do a good job of waterfowl protection. It has been able to retain the abolition of baiting and the use of live decoys—first invoked in 1935—doing so in the face of pressure. It has extended the system of refuges in the United States. It sought, in increasing the length of the 1940 season, to compensate by cutting the bag-limit from ten to seven. The higher limit was restored by Secretary Ickes, however. Election years have often colored legislative and regulatory action.

Dr. Gabrielson is a man doing a complicated and difficult job. Any man in such a position can fight for what is right only so long as his hand is powerfully sustained. If, however, the nature and strength of other pressures are such that he must compromise, he will do so by yielding as little as possible. This Dr. Gabrielson has done, but, as the Emergency Conservation Committee points out, "it is self-evident from the nature of the pressure and the nature of the recent relaxations that one has caused the other."

"For instance," the statement continues, "the possession-limit was doubled after the Special Committee on Wildlife Resources of the House of Representatives (actually a pressure body for the big killers) reported favorably on a bill to compel such action. Not the status of the waterfowl, but Congressional bludgeoning was the ruling factor. . . .

"By analyzing the relaxations in shooting regulations during the last few years, it is easy to see that the government has yielded to pressure where it would satisfy the largest number of hunters, and produce the smallest increase in the kill. . . . If compelled to choose between two evils, Dr. Gabrielson has chosen the lesser one. But, yielding is dangerous, and can be disastrous, because the inevitable tendency is for the relaxations to outrun the margin of safety."

It seems to us that the danger of even slight concessions to destruction at this time should be evident to all—administrative agencies and hunters alike. Always, since restoration of the birds was seriously attempted, it has been recognized that increases in breeding stock were necessary for any surety. It has been realized that small increases from a dangerously depleted stock are not sufficient. How, therefore, can the Fish and Wildlife Service

ignore the growing danger of losing the small safety margin represented by slight increases? We do not believe that the Service is as optimistic as its reports sound. The closing paragraph in the chapter on migratory birds in Dr. Gabrielson's recent book on Conservation sounds a warning note—almost a despairing one. Discussing the restoration program and increased hunting demands he closes the discussion by writing:

"On the other hand, if for any reason such a program, or a better one, if possible, cannot be completed, there is little hope for the migratory-waterfowl resource. The birds will be seen in decreasing numbers until only a few will be left to use the refuge areas. In that case, the refuge system, designed to safeguard and help increase the supply of birds, may degenerate into a series of outdoor zoos for waterfowl, harboring only a remnant of the once magnificent squadrons."

With such a dire picture in mind we may well give heed to the Emergency Conservation Committee's comments when it says:

"In relying for duck protection on bad weather for hunters, the Fish and Wildlife Service is like a roulette player who wins three times in a row, and doubles his stake each time he wins. His cumulative gains will be wiped out in a single loss, which is sure to come. So, too, the cumulative gains in waterfowl breeding-stock will be imperilled whenever it happens that good hunting weather prevails from Canada to the Gulf throughout a season that is now too long.

"Recent gains in breeding-stock which look big in percentages are, actually, small. Nine-tenths of all the ducks on the continent were wiped out during the thirty-year decline which resulted from spring shooting, large bag-limits, long seasons, baiting, live decoys, drought and drainage. Even supposing that the waterfowl have doubled since 1935, when real protection began—they are still only one-fifth as numerous as at the turn of the century. They have not yet risen even to the alarmingly low level of 1930."

In these same five years the sale of duck stamps has more than doubled. There are, therefore, probably fewer ducks per hunter than there were in 1935. Thus the gains, much publicized by duck hunters, must be looked at realistically. The regulations in 1940—and those for 1941, if they prove to be the same or still easier—were too lax and allowed no margin for bad luck for the ducks whether in weather, drought or other catastrophies.

"Another factor," the Emergency Conservation Committee pertinently observes, "is the closing date, which is more important, much more so, than the opening date, because most of the waterfowl breed in Canada, and do not cross the border until October, after which the birds are on the move southward. Shooting is easier, heavier and more continuous on the resident winter feeding-grounds than on the line of migration. A 60-day season for the Gulf States, ending December 15, allows more shooting than a 60-day season for Minnesota, beginning October 1, because shooting ends in the north when the ponds freeze.

"Another step which should be taken by the Fish and Wildlife Service is to forbid hunting of migratory birds by any person in more than one geographical zone. The biggest game-hogs in the United States, and the most violent enemies of necessary protective measures, are men who shoot successively in the northern, middle and southern states, pursuing their prey like sharks after mackerel. It is unfair to the average hunter that these insatiable killers should be allowed to migrate with the waterfowl, shooting as they travel. They are actuated, not by decent sportsmanship, but by a lust for killing which decency and fairplay require to be checked. Their special privileges should end."

Based upon the sophistry that the birds are being shot anyway, and that to permit a limited bag would make "honest sportsmen" out of "unintentional" violators, the way has been paved for the return of the wood duck to the shootable list this year. The Special Committee of Wildlife Resources of the House of Representatives thought this up. So this interesting little duck, unimportant as food, uninteresting as a target for a real sportsman, and almost "domesticated" by protection, is slated to be shot in 1941.

Here we have a fair and defensible picture of the migratory waterfowl situation. In view of it the Emergency Conservation Committee urges all interested in real protection for wildlife to write to Harold L. Ickes, Secretary of the Interior urging (1) no shooting anywhere after December 15; (2) hunters of migratory birds to be limited to one geographical zone; (3) no more step-by-step surrender to pressure; (4) no open season on the wood duck. We hereby add our endorsement to these measures. We should stop gambling with the ducks and geese as stakes.

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It is estimated that the total world population of whooping cranes does not exceed two hundred birds, and some ornithologists set the figure much lower. It is certain, however, that this bird is struggling for survival as a species. Although completely protected since 1918, these great cranes with the strange call are often shot illegally out of curiosity. The wintering population on the Aransas National Wildlife Refuge in southeastern Texas this year included 26 individuals, an increase of four over last year. This, however, is no cause for elation. A bird so reduced in numbers has a slim chance to escape extinction.

In times such as these the report of the Chief of the United States Forest Service takes on particular significance. In his report for 1940 Earle H. Clapp, Acting Chief, declares that, despite the fundamental importance of forest resources, "the United States is not handling its forest resource in a manner to insure continuous uninterrupted production, even of certain material needed for national defense." Mr. Clapp urges a forest program designed to create a forest economy as a part of our agricultural economy and as an essential to national welfare, including national defense.

"EYES THAT . . . FLASH DEFIANCE AT ALL THE WORLD AND REMAIN COMPLETELY CALM IN THEIR DEEP DEPTHS."

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Expression in Birds

By EDMUND J. SAWYER

Illustrated by the Author

THE "crest fallen" appearance of a bird low in spirits is one of the few expressions or moods of birds that have attracted sufficient general attention to create a popular simile. This seems the more strange, since there are in common use so many words or phrases relating to other characters of birdlife—"as tender as a dove", "as fierce as a hawk", "proud as a peacock", "a duck out of water" and so on—characters that are matters of expression. In general it may be truly said that all birds are gifted with the power of what closely corresponds with facial expression in humans. In a few species the gift, it is true, seems rather negative; just as, in our own species, the "poker faces" and "dead pans" are in the minority.

A bird portrait should be more than a matter of correctness of plumage and proportions. Suppose one were to paint Washington with a sinister scowl, or Lincoln with the mental and moral appearance of a Simon Legree! A warbler's expression will not do for a dove, nor will the brooding eye of the latter fit the hunting falcon. Suppose that, asked to describe the facial characteristics of a human acquaintance, we were to reply that his face discloses him to be a Jew, a native African or a Norwegian, as the case might be. Expression means something far more personal and more nearly individual than that, of course, in the case of humans. This is also largely the case with birds.

SOME STUDIES THAT SUGGEST WHAT IS GOING ON IN THE ROBIN MIND

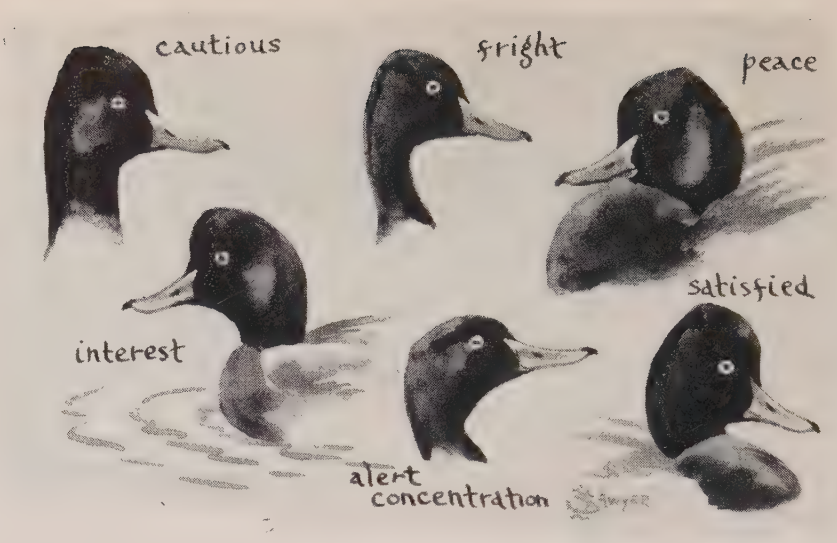
In man and bird alike expression centers in the eye. We shall return to that.

We express much with our eyebrows and foreheads, and there is a corresponding facility in the scalp feathers of birds. It even seems logical to assume that the movements of these feathers are merely incidental to smiles—the superficial evidence of frowns, and other expressions of emotion quite analogous with our own. Who has not been impressed with the "speaking" crest of the cockatoo? In fact to a bird its crest is almost a second tongue. According to the extent and manner of its raising or lowering it expresses joy, sorrow, peace, fear, alarm, terror, alertness, ease, defiance—in short the "mood" of the bird, whatever it may be at the moment. In this major respect there is no line that divides the crested from the uncrested birds.

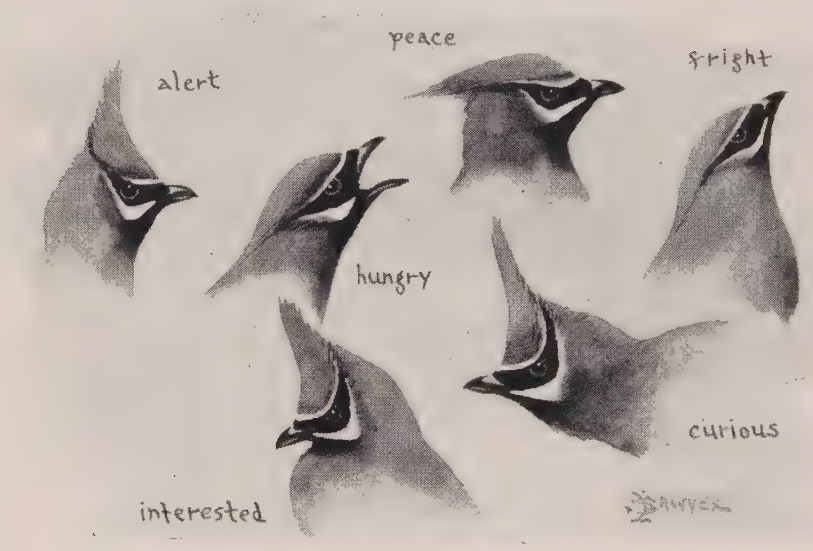
Fundamentally, the warblers, sparrows, wrens, all woodpeckers, flycatchers, thrushes are truly crested birds. They habitually employ their crown feathers in expressing their varying emotions. I have often seen waxwings with even their usually jaunty crests so depressed as to be invisible; bluejays so terrified that their crests likewise disappeared. On the other hand a tree swallow will often, if observed closely, be seen to accompany his peculiar scolding note with the display of an unsuspected crest—a decided pompadour no doubt calculated to intimidate a rival or strike terror into the hearts of small enemies. Of all birds, the typical non-crested ducks would seem to be among the least capable of, or inclined to, expression. Yet hundreds of my own life-sketches of mallards, teal, pintails, scaups and the other species are exclusively expression studies. The present illustrations—examples of scaup expressions

—might have been, indeed may have been, made of the same individual in the course of some ten minutes as the bird reacted to other birds, and to other conditions about him.

The eyes of birds are wellnigh limitless in their power of expression, as are our own. I think that, of all the brooding tenderness and devotion I have ever seen in the eyes of a bird, nothing has quite equalled the eyes of a sparrow hawk that were turned up at me when I looked into her nest-chamber as she brooded her newly-hatched young. It is significant that she had been sitting unflinchingly throughout the commotion of a half-hour climb to her nest in its shaky dead stub.



THE SCAUP DUCK AND THE CEDAR WAXWING MAY BE THUS EXPRESSIVELY OBSERVED



In some birds expression is marked by uniformity rather than by facility. Such species are likely to compensate with eyes peculiarly eloquent of the bird's nature and environment. It has been observed that sailors and plainsmen, respectively, have eyes that reflect the rough and trackless ocean, the breadth and austerity of the desert. There are few, if any, avian eyes so nearly blank, unchanging, noncommittal as those of the whip-poor-will, the nighthawk and their allies. And yet for these strange birds of the gloom no eyes could conceivably be more appropriate or truly expressive. Weird nocturnal moths among birds, there is in the impenetrable blackness of their great eyes the spell of night, the mystery of the stars. Intensifying rather than relieving the mystery of their depths, a crescent of highlight rests in these fathomless orbs as a pale moon dwells in the infinite sky. Their gaze is the calm, noncommittal stare of a Sphinx—those eyes fit windows of the songless, silent, night-loving soul that dwells within.

Eagles have perhaps the most strikingly expressive eyes of all birds. When hungry, and definitely intent on prey, the fierce, piercing concentration of the eagle's riflelike eye-shot is irresistibly striking and haunting. This is particularly true of the golden eagle. But the bald eagle, for all his less-aggressive hunting habits, has by no means lost the power of forceful expression. Even in repose there is, in an eagle's bold, outstaring scrutiny, an expression of the loftiest pride, complete self reliance; an expression that admits of no fear and no superior. I know of no other eyes, certainly of no human eyes, that can so plainly flash defiance at all the world and remain completely calm in their deep depths. Here are eyes that command and impel as from a throne—a throne to which there can be no rival claim.

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BUTTERFLY

By WADE VAN DORE

Black soil, green grass, white cloud, blue sky,
Bright sun, dull moon, star far and high,
Thank you for making *me* the eye
That saw, today, your butterfly.

LUNULARIA IS ONE OF THE LARGER LIVERWORTS

Why Overlook the Liverworts?

By DOROTHY SUTLIFFE

Illustrated by Alice B. Chittenden

THE FIRST PLANT YOU TAKE MAY BE *MARCHANTIA*

EVERYONE, in passing, notices the ferns and admires their loveliness. Most people recognize mosses and are pleased by their daintiness. A few pause long enough to look at the lichens and sense their beauty. But when it comes to the liverworts or hepatics (not by any means to be confused with the flowering *Hepatica*), they are ignored, although none of the flowerless plants are more interesting or attractive. To be sure, they are very small but yet easily discernible to those who have an eye for Nature's offerings, although their real inner beauty is discovered only by the aid of a microscope.

Liverworts lie within our vision when we walk among the trees, beside the brook, near a roadside bank, or when we clamber over the rocks. The casual observer would say that they are always green and have not the arresting color of other lowly plants. Careful examination will show that they use, in a limited way, bits of red pigments, are partial to a good deal of royal purple hue, as well as browns, and to every shade of green from the lightest to the darkest. These colors they often use on their underside, as if merely for their own pleasure, for they do not have to use gay colors as flowering plants do to attract insect visitors. They are independent of any help, except that of water, in their reproductive processes.

CEPHALOZIA IS A LEAFY LIVERWORT

There are two divergent orders in the liverworts—the flat leaf-like ones that hug the ground or whatever their foundations may be, tight held by the finest of root hairs; and those that have a real, though tiny, stem with two-ranked leaves and in most cases a smaller row of leaves on the under side of the stem. The leaves on the latter kind of liverworts are greatly varied in form and have a beauty that is astonishing to those willing to observe them through a hand lens or, better still, through a compound microscope. All are small and cannot be measured in inches, so must be described in millimeters.

Some of the flat-growing liverworts have spore cases that look like blades of grass and are quite noticeable. There is nothing to indicate to the uninitiated that these are the elect of the hepatics, but it was a relative of theirs that eons ago finally left his close relatives and became a plant of a higher order. The liverworts are really the forerunners of all plants, according to some scientists, who believe they were the very first vegetable life to leave the waters and step on land. Their habitats prove them to have been water plants for, with a very, very few exceptions, they must live in wet places and have moisture to carry their spores.

Two of the largest of the hepatics are *Conocephalum* and *Marchantia,* and the first plant you gather and take to a hepaticologist for identification is almost sure to be one of the latter for they grow in almost all parts of the world, and seem to attract the eye. They are as common as yellow mustard. Another often seen and comparatively large liverwort is the one called *Lunularia,* named for the little crescent-shaped cups on its flat surface. These little cups are interesting, for they hold small disks and these give them another way of perpetuating themselves. Some of the leafy liverworts have the same wise scheme, with the wee disks growing on the leaf edges. This *Lunularia* is the only one of these plants that seems to like to live among cultivated flowering plants. It is to be found especially in greenhouses and in flower plots, where it runs riot.

What do they use instead of flowers to reproduce themselves? Spores is the answer, and they have innumerable contrivances for the purpose of bearing and distributing these spores. The simplest of the hepatics—called *Riccia*—forms its spores within its flat, leaf-like part, finally rupturing the upper surface to let the ripe reproductive elements escape. When you go a little higher among these plants you will be surprised at the varied and ingenious parts they develop for containing and distributing their spores. The first thing visible to the naked eye is a wee receptacle like a closed cup or urn out of which will finally come an almost thread-like stem, bearing on its summit a round or oval top. That is where you will find the almost ripe spores, and eventually the top will split by several valves and out will pour the finer-than-powder beginnings of new plants.

The little leaves are in themselves a wonder. Many are simple with smooth edges, but others are graced with all sorts of toothed edges and are almost thread-like or lace-like in their structure. Their pores, too, have various shapes and patterns, which are a great help in finding out what your plant is.

If you have gathered some of these plants when out in the open, do not be discouraged if you find them wilted

and limp on returning home. They can be completely revived by being placed in cold water (completely immersed), for a short time, and can be revived over and over again. If they are to be viewed through a compound microscope they should be transferred directly from the water to a dish containing half water and half alcohol and then be given a soaking in a bath of equal parts of glycerine and water. Since they are cell plants, it is easy to observe through the lens the different cleverly-contrived parts. So do not be afraid to slip your fresh-gathered specimens into a piece of paper or an envelope and when you have finished examining them, put them away in envelopes, on which write the name, the place where gathered, and the date. Before you know it you will have an interesting herbarium of liverworts and will have begun to cultivate an interest that will grow with the years.

ANTHOCEROS IS INTERESTING

They have no "common names", but do not let that discourage you, for neither have the lichens nor most of the mosses. You will find their botanical names very pretty and be well repaid for the extra work in learning them.

After all, why should anyone shy away from scientific names? Our grandmothers, even in the backwoods, used them without hesitation, blissfully unconscious that science presented any difficulties. With the growing popularity of gardening among all our people the use of names that are derived from the Greek and Latin is fast increasing. A people who have learned to use, without conscious embarrassment, such names as begonia, coreopsis, delphinium, eucalyptus, geranium, hibiscus, hydrangea, oxalis, portulaca, sassafras, smilax, verbena, viburnum, and even chrysanthemum and rhododendron—all scientific names if capitalized—can well forge fearlessly on, even into the realm of the lowly liverworts. Such explorations are worth the effort.

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The "Gray Boomer"

The big Kangaroo of the Antipodes is a natural fighter

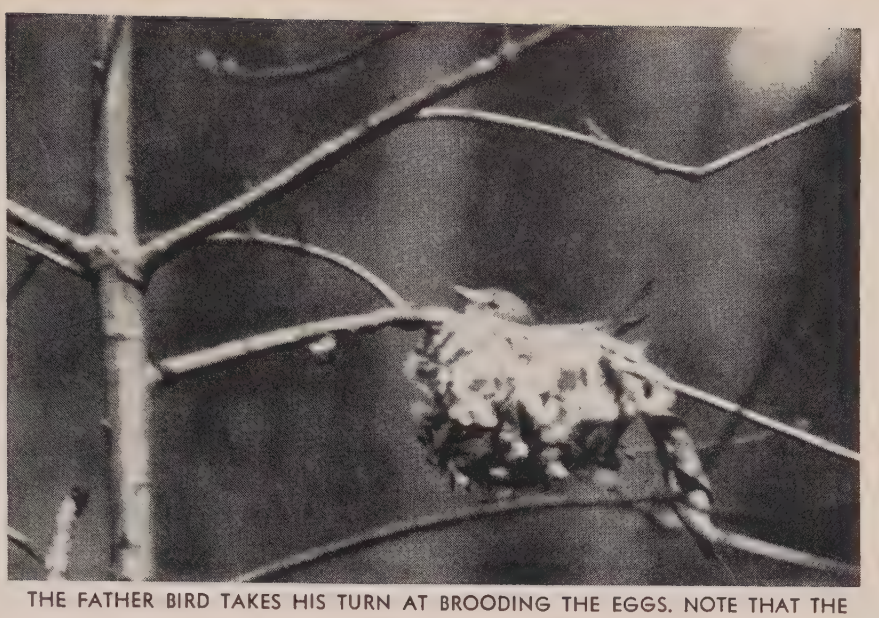
By ARTHUR H. FISHER

WHEN THE great gray kangaroo, or "Boomer", as the male *Macropus giganteus* is called in Australia, decides to be belligerent he needs no special training in the manly art of self defense, and in captivity is all too willing to carry the fight to his opponent. Often exceeding 160 pounds in weight, these strange marsupials are ever dangerous antagonists to man and dog when brought to bay in the wild open brush country they inhabit. A properly-delivered blow from a hind foot, equipped with a long, sharp claw, will disembowel the most doughty dog or lightly-clothed human. In flight they are capable of great and sustained speed, clearing barriers five feet in height and a space of more than twenty-five feet in a single bound. While traveling at high speed they have a peculiar habit of looking back over their shoulder, which frequently causes death from colliding with obstacles in their path.

They also have the habit of "sparring" with each other, standing erect in a peculiar tripedal fashion, leading, blocking and feinting with their five-fingered, short and free-moving forearms. In this position, when they come erect on their toes, they will exceed the height of a tall man, and they possess a rare ability to follow motion. Showmen take advantage of this and exhibit them as "trained" boxing kangaroos, when as a matter of fact they have brought the art of boxing to the showman from the open spaces of their habitat. It is interesting to note in the accompanying illustration, made in the Philadelphia Zoo, the human-like development of the neck, pectoral muscles and biceps. They suggest respect for the "Boomer's" strength.

The Secret in the Oak Sapling

By GRACE WHEAT



THE FATHER BIRD TAKES HIS TURN AT BROODING THE EGGS. NOTE THAT THE OAK SAPLING IS STILL LEAFLESS

It was a lovely warm day in mid-April when mother first espied this birdland treasure, a basket draped with cotton, suspended in a bare, forked branch of an oak sapling in the yellow pine woods near Durham, North Carolina. Through the lining of pine needles all we could see was white cotton. All over the outside were drops of cotton, with a dry curled-up oak leaf attached carelessly on one side, and even on the leaf was one daub of bright yellow. Only close scrutiny revealed the small particles of grapevine bark fiber and leaves woven in. We both had the same thought "An odd hornet's nest; so small for one, too." Remember, it was before the leaves came out; the nest was new and so much cotton gave it the appearance of a light gray ball. Mother walked right under the nest without the bird's flying, but when she discovered it was inhabited we quietly backed away. My heart was thumping fast, for the discovery of that nest was a thrill I shall never forget. At first we puzzled somewhat over the right name for these vireos, but concluded they were the blue-headed, called also the solitary. Usually it nests in the mountains.

The birds seemed, from first to last, to have little use for us clumsy, earth-bound beings. The nest, eight feet from the ground in the fork of a branch, measured about three inches across. In this a miracle happened—from the pinkish white eggs sparsely dotted with reddish brown spots came three bare little bodies. This cottony cradle lined with pine needles was rocked by the wind, looked into by butterfly, bee, and soaring buzzard, but harmed by no one.

The second time we went to the nest it was our pleasure to watch the parents change places, with both of us standing nearby. One brought a piece of cotton from the highway where it had blown from a passing truck. Perhaps the parents wished to make the home softer for the delicate eggs, or did not fully realize that nest building was over. Both humans and birds are inquisitive. Every time one of us walked around beneath the nest the brooding bird would peek over the edge and keep turning its head to follow the moving figure until we surely thought its head would twist off. She was an obliging mistress of her home, allowing us to raise her to one side to get a peek at the eggs. When the father was fearful he chirped in loud and soft tones, raising the feathers of his head, and singing his usual song nervously as if to keep up his courage.

Many times I tried to interpret in human language the things these two feathered lovers said. Once it sounded like "Mary, come, dear". At another time when I was too near the nest she would not give her mate the usual signal "safe" to come and brood, although he was near and kept asking "yah, yah?" When I retired a short distance he came, sitting on a pine nearby until she answered his "yah" with "yup", and left the nest like a flash. Each made

EVERY TIME ONE WALKED AROUND BENEATH THE NEST THE BROODING BIRD WOULD PEEK OVER THE EDGE

THE LAST TO LEAVE THE NEST. NOTE THAT THE PLUMAGE IS WELL-DEVELOPED, AND THAT THE WING-BARS ARE ALREADY IN EVIDENCE

sure that all was safe before exposing the precious treasures. Often when I could not see a sign of the other bird I heard the brooding one give that peculiar note asking the other to come and take its place, and soon the mate would appear, answering back in soft tones. That soft note carried for a long distance, like the sound waves that come over the radio. Hank's cheerful everyday song, aside from the love talk, was: "cheer—cheero—share—sharo" clear, high-pitched, a little varied and with a pause between each syllable; some would call it a warble. Its song is much more pleasant to the ear and more varied than that of the red-eye, and is not so loud.

Brooding was being carried on in earnest the day we found the nest and the last egg was laid the following day. Ten days later we found three little birds several hours old. The afternoon before, at 4:30, the bird had seemed to turn the eggs with its feet, and reached into the nest with its bill. We were careful at this time not to alarm them, for fear they would leave the nest. Again at dusk, 7 P. M., I saw the nest for the last time that night, and once more the eggs were turned, apparently. When the wind swayed the sapling the bird would crouch low, and when a bat flew over the mother almost disappeared in the nest, leaving only a slight trace of tail and bill showing above the rim. Feedings did not come very often the first day and when they did it was a large soft-bodied beetle, with the wings torn off, put directly from the parent's bill into the throat. Later both parents fed by regurgitation.

Little incidents happen in all happy homes, especially at the table when baby crams too much into its mouth. On the sixth day, when the male came with food, the morsel was so large, the size of a June beetle, that the youngster could not get it down. Papa tried to help by pulling and pushing, but all in vain; so he pulled the beetle up, and stuffed it down another's gaping mouth. It seemed cruel to feed such large insects from the very first. It may have been the first time this pair had reared a family and they needed instructions on the care and feeding of infants. At different times I saw the parents beat a moth's wings from its body on the favorite pine perch, catch insects in the air, and talk back and forth with their mouths full. Their scolding resembled the sound of drawing rosined threads together.

On the seventh morning after the three babies arrived, I noted that a decided change had taken place in their appearance. What I call pin feathers had become large and blue, and olive-green feathers were coming out on the back. On the eighth morning they opened their eyes. On the tenth day the white eye-rings began to show; the two wing-bars, and the black tertials with lines around them, were distinct; the breasts white; the sides yellowish.

On the next day, May 4, a very hot day, we found the three young gasping for breath. Mother and I shaded them from the sun with a man's handkerchief. Right away the young drew their heads back into the nest, closing the gaping mouths, but opening their eyes to see what had come to their relief. Papa Vireo came, and rested on the nest edge a minute before leaving for food. In the afternoon we found the young in the sun again and climbed up to rearrange the sunshade. This time Papa firmly disapproved, and decided to drive me away if he could. But flying near my head and pecking at the cloth did not frighten me, so he quieted down and sat by the nest for a time after I had retired to a distance, presumably thinking. We observed that very little food was brought during the hottest part of the day; more in the cool morning and late afternoon.

From the time I first took one of the little fellows out and showed him the wide, wide, world he seemed to be discontented with the scanty nest quarters. How much like a human being. The day before all of them flew, this sweet little duffer climbed to the nest edge where he did his daily dozen. As we walked around the nest he would twist his head almost around. He had a comical way of placing his head in an impertinent position, making us think of a penguin. He would climb to first one branch, then another, a little farther and higher from the nest each time. He tried a simple note or two, flapped his wings, and cleaned and straightened his already tidy feathers. All the time he talked, telling the ones in the nest what he was seeing, how far out he was, and didn't they wish they were out, too? He acted just like a grownup vireo, preening himself and talking. Once during this time Papa Vireo drove a robin out of the vicinity. Then one of them flew about teasing baby to come away, and soon I missed him. After a long search I found him (Continued on page 293)

EXPERIMENTAL RESULTS OF DIFFERING TREATMENT OF PLANTS

PHOTOGRAPH COURTESY OF WILLIAM H. RORER

Front and rear trays at left were watered with plant food without hormones or vitamins; those at right with plain water; those in center with a commercial hormone-vitamin food. Otherwise identical conditions were provided

Alchemy in the Garden

By ANDREW S. WING

Garden Editor of Nature Magazine

ADVANCES in the knowledge and use of chemicals and biologicals for both plants and animals have come with such rapidity in recent years that the non-scientific layman hardly knows what to believe. He is constantly urged by commercial agencies to use this, that or the other vitamin, mineral, gland extract, or similar aid to Nature until he becomes so confused and gullible that he will swallow almost anything, or else goes to the other extreme of complete skepticism.

There is no need to stretch one's credulity a bit, as the actual discoveries, many of which have been applied to everyday use in gardening or some phase of plant growing, are so remarkable that if we could not see them with our own eyes they would sound like the work of Merlin, the magician. Perhaps it might be well briefly to survey the actual accomplishments in this field. The treatment of plants by chemicals and vitamins may be considered under the following groupings.

Propagation from cuttings and seeds; fruiting without pollination; plant breeding; feeding of plants in solution, sand or soil (chemiculture); stimulation of plant growth by vitamins; prevention of fruit-drop, and artificial ripening or coloring of fruit after harvesting; restriction and control of insects; control of weeds.

Without any attempt to make a complete outline of the work accomplished under the above headings, let us take a look at some of the more recent developments. Seeing is believing, and what I describe I have either seen with my own eyes, done with my own hands, or have learned from unimpeachable sources in this field.

The use of organic secretions or hormones to promote growth has been developed until it is routine practice in greenhouse and nursery work for the rooting of cuttings, especially those that are difficult or slow to propagate, such as azaleas, holly, fruit trees, and others. This technique was first developed at the Boyce Thompson Institute for Plant Research at Yonkers, New York, by Dr. P. W. Zimmerman and Dr. A. E. Hitchcock. This same pair of painstaking investigators had previously made interesting and vital studies of the longevity of seeds, and the treatment of seeds through storage under varying conditions and at different temperatures so as to hasten germination.

No sooner was their work with plant-growth aids made available than a number of people, most of them commercial-minded, jumped to the conclusion that methods suitable for cuttings would work for seeds, too. However, to date, no discoveries of note have been made to prove that such organic substances used for cuttings, or even vitamin B_1, have any appreciable effect on the germination of grass or other seeds. Seeds go through certain chemical changes that may be accelerated by stratifying them at such temperatures as they would naturally go through outdoors. But the use of chemicals does not seem to have much effect, except in the case of certain hard-coated seeds where soaking in a solution of weak acid, saltpeter, or other chemical weakens the shell. This is fairly common practice in horticultural establishments both in Europe and America. However, the action is more of a mechanical character than it is of a chemical nature.

RESULTS OF TREATMENT WITH B-NAPHTHOXYACETIC ACID

Tomato flower cluster at the left is normal with four buds open, and beside it a cluster two days after acid treatment. Ovaries developed although some buds are not opened. The plant was photographed eight days after acid application. Note that floral parts still persist

Recently it was my privilege to see the results of some work that Dr. Zimmerman and his colleagues have been doing in the field of producing fruit without pollination. Here we enter a field where the results are so astounding that one is tempted to indulge in superlatives.

Dr. Zimmerman, who looks more like a prosperous merchant than a first-rate scientist, had on his desk two small, green tomatoes of the Bonny Best variety.

"How would you like to see a seedless tomato?" he asked, and without waiting for my reply proceeded to cut one open, cautioning me, however, in true scientific fashion, that we might find one or two seeds. However, the tomato was entirely seedless, and the seed cavity was small. The only difference that I could note between it and a normal Bonny Best was that the blossom end was somewhat enlarged giving it something of a point.

Dr. Zimmerman then pointed out that this fruiting without the usual fertilization of the seed by the male germ or pollen (parthenocarpy) was caused by an organic compound named *Ethyl B-Naphthoxyacetate*, which can easily be made up in a laboratory by anyone with a knowledge of chemistry, in less than a day, and at a total cost of about one-half cent per liter of the stock solution as used on plants. It will no doubt soon be available in commercial form for those who wish to experiment with it on their own plants, either indoors or in the garden.

Of course, if this "Ethyl B-Naphtho's" (to use an unauthorized abbreviation) were only applied to the tomato plant, it would be very useful in the greenhouse or garden, but perhaps not of sensational importance. But the stuff does other amazing things to all kinds of plants on which it has been applied. It brings about prematuring flowering on tobacco; causes gall-like growths on stems or brings about a growth of roots; makes stems bend in curious loops; stunts leaves, causing them to grow in curious untypical whorls, and changes their shape. A coleus plant, for instance, changed color where the chemical had been applied; in fact all kinds of freakish things occur in unpredictable ways. At least that seemed to this observer to be true, and Dr. Zimmerman admitted that he was not yet ready to explain just why it acts the way it does, or to suggest the extent to which it can be used to serve useful or scientific purposes.

A little speculation is perhaps permissible as to some of the possible uses of this new drug—if it may be so called—in applied gardening

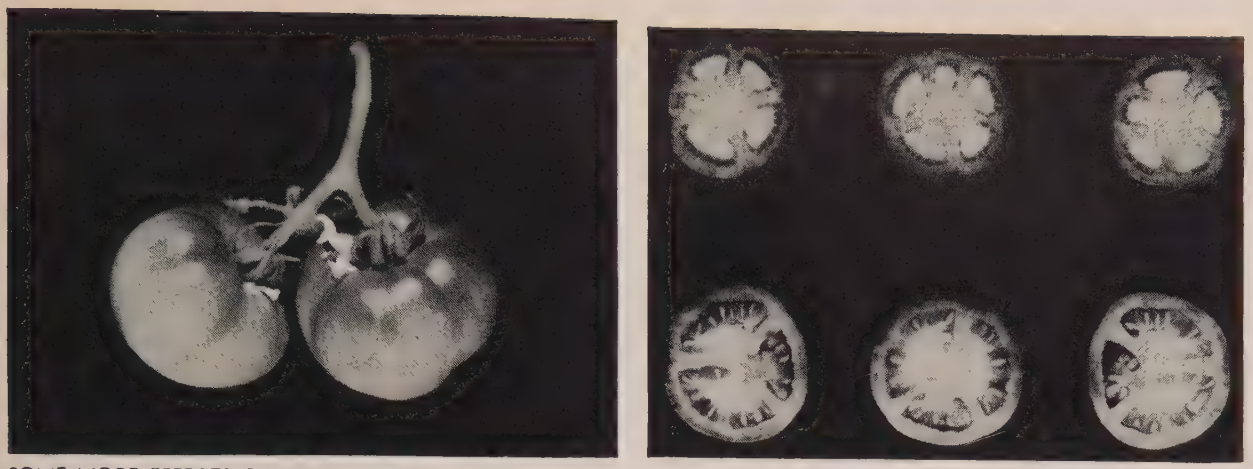
If it hastens the flowering of one plant it is reasonable to expect that it may affect other plants in a similar way. This might be of great value to commercial flower growers and an aid to amateur gardeners. If it forms seedless tomatoes, it may also produce seedless melons, cucumbers, apples, grapes, pears and many other fruits. Imagine being able to enjoy seedless raspberries, blackberries, gooseberries, and blueberries!

If it changes the color of a coleus, it may change the color of the foliage or even the blossoms of many other plants! It is much too early to predict the extent to which this drug may be used, because it is still in the laboratory stage.

And since it is capable of being produced cheaply, and since it seems to be perfectly harmless to humans, and will no doubt soon be available for widespread experimental use, no one knows what strange things it will bring about in the hands of curious and imaginative plantsmen!

I leave this matter in the hands of Dr. Zimmerman and those to whom he chooses to release its secret. But if it will do no more than give us seedless watermelons and a few reliable flowering houseplants to brighten my indoor winter garden, I will be forever grateful! It would seem offhand as though the bee might lose one of his main jobs —that of pollinating plants for fruit production—and his efforts could then be confined more strictly to his useful function of gathering honey. Who knows? If you want to try this on your own plants, one of the commercial rooting substances can be used, though it may not work as well.

So much has already been said about the growth of plants with chemical (nutrient) solutions, that it begins to seem like old stuff to one who has tried it or studied the literature on the subject. Chemiculture has been going on in the laboratory since shortly before the Civil War,



SOME MORE EFFECTS OF THE ACID TREATMENT

These tomatoes are the same ones shown on the opposite page thirty days after the flowers were treated. The cross sections show normal fruit, with seed and seedless fruit cut open when about half ripe. This indicates the strange things this acid seems to do with plants. Photographs from Boyce Thompson Institute

and recent years have seen it applied to commercial greenhouse work in constantly increasing proportions. There are still those who adhere to the belief that only soil will grow plants to perfection on a commercial basis or in the ordinary amateur garden. To those skeptics it need only be said as tactfully as possible that they, unlike the ostrich, are hiding their heads in the dirt; and it would be better if they took a good close-up view of the sand accompanied by a sprinkling by competent hands of a dose of chemical plant food. By sand I refer to what is commonly called "gravel culture" in Ohio, New Jersey and other states where it has been developed to a fairly high degree of proficiency.

For more than a year I have been growing plants indoors and outside in pots, tubs and other containers filled with coarse builders' sand, untreated except for washing (probably unnecessary), and fed several times a week with a nutrient solution. These solutions have been mixed by my own hands (cheapest and best but more trouble), or they have been stock solutions from various commercial sources. I have grown many good plants by this method, and some of them are now in their second year. They have, on the whole, done as well or better than check plants potted in soil, and have been very little more trouble, except that sand in small containers dries out faster than soil.

However, to do a good job of soil-less gardening requires more study, thought and care than the average gardener is willing or able to give to his plants. If he wants to do just a fair job, he should get one of the so-called automatic outfits. I have several of these of various types, both home-made and commercial, and they *do work*. The pots are of the self-watering type consisting of a wick of clay pottery, fiberglass or asbestos which extends down from the plant compartment into a vessel of solution beneath. You can fill these up, go away and leave them for several days or a week, and they will be quite healthy and happy when you return, provided the solution holds out.

There is even an automatic greenhouse on the market now. I know a man who owns one—an 11-by-18-foot outfit that has an oil burner, automatic ventilation, and automatic feeding of the plants by a time-clock-controlled electric pump which sub-irrigates the sand-filled benches. He grows good plants too. If that is not the ultra-extra of "gardening made easy," I don't know what is. This outfit costs about as much as a small car, but that is not so much as greenhouses go.

Mr. Sven S. Sealander, one of the best professional gardeners I know, ran a soil-less greenhouse on an estate at New Canaan, Connecticut, where he grew about everything in the way of indoor vegetables and many flowers with sand culture by the hose or "slop" method, with really remarkable success. The cost for chemicals used was about two dollars a month in a 5000-square-foot house, a very small amount compared with the cost of greenhouse soil, which has to be renewed and sterilized every so often. The melons, tomatoes, broccoli, cauliflower, string beans and lettuce he grew for his employer, Mr. Abraham Hatfield, were of fine quality, and the latter believed them to be higher in mineral and vitamin content than those grown the usual way.

Mr. Sealander had worked out a way to cause his hothouse melons to set fruit by controlling the acidity of the solution, and he kept down red spiders by using a high-magnesium-content solution. He had also banished crab grass from the large lawns by treatments of sodium chlorate. A keen, simple, unassuming Danish gardener (but with a degree from the University of Copenhagen and training at Kew!), Mr. Sealander represents to me the type of men who will be the expert gardeners of tomorrow, and they will not call themselves "plant wizards" either.

A great deal of publicity has been given colchicine, potent essence of the lovely little autumn-blooming crocus or colchicum. In very dilute solution, this drug (originally a gout cure) has a powerful effect on plant tissue, its most useful function being the power to affect the number of chromosomes in the embryonic seed of flower. For instance, if you want to cross one species of marigold which has only 16 chromosomes with one that carries 32, it can not be done normally, (Continued on page 289)

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

OUR DWARF-SIZED SUN

By ISABEL M. LEWIS

COMPARED to the planets that circle around it the sun is tremendous in size. More than 1,298,000 globes the size of the earth could be fashioned from its great bulk. If we represented the sun by a globe a foot in diameter the earth would be the size of a mustard seed in comparison. Place the earth at the center of the sun and the moon in its orbit, distant 239,000 miles from the earth, could revolve around it and still be nearly 200,000 miles below the surface of the sun. All nine planets of the solar system, assuming Pluto to be about the size of the earth, and allowing Saturn 172,000 miles to include the great extent of its ring system, could be strung along a single radius of the sun, and still fall short of reaching to the surface by more than 75,000 miles. Add to these all the satellites of the planets and the planetoids and still the line of members of the sun's family would fall some tens of thousands of miles short of the surface.

If the earth were dropped into the umbra, or darkest central portion, of a fair-sized sunspot it would just about cover it, but it would scarcely be visible to the naked eye at our distance from the sun. It would be completely lost in some of the great solar prominences that extend to distances of 100,000 miles or more above the sun's surface. Eruptive solar prominences shooting upward to heights of more than 300,000 miles—a distance of more than a third of the diameter of the sun—are of less frequent occurrence but by no means unknown. The greatest height of any known prominence was that of the prominence photographed at the McMath-Hulbert Observatory on Sept. 17, 1937. This extended to the astonishingly great distance of about 860,000 miles. In any consideration of the sun itself, and its size and importance in the solar system, we should not overlook its extensive atmosphere, its beautiful chromosphere, brilliantly-colored with luminous gases of many chemical elements, and its pearly corona, which completely envelopes it. Streamers of the outer corona have

been observed—during total eclipses of the sun—to extend to distances of several million miles above the surface of the sun.

When one considers some of these facts about the ruler of our solar system, which tend to impress us with an idea of its great size and importance, it is possibly with a slight feeling of chagrin that we learn that among the other stars of the universe it is neither great nor exceptional, just a little dwarf star in the Milky Way.

There is a way the astronomers have of comparing the true brightness of the stars as distinguished from their apparent brightness, which depends on how far away the star is from the earth. If one knows the distance of a star as well as its apparent brightness, it is possible to find its absolute magnitude, or how bright it would be at a certain standard distance. This distance is taken to be about 33 light years and at this distance all the stars whose true distances from the earth are known can be, as we might say, lined up and compared. We know, for instance, that at this distance our sun would shine about as brightly as a star of the fifth magnitude.

Let us consider now how some other stars that are well known to us would appear if they also were placed at this same distance of 33 light years from the earth, which is actually about two million times the distance from the earth to the sun. Sirius, brightest of all the stars, would be a star of first magnitude about as bright as Regulus, and about 27 times brighter than the sun. Rigel, which is far more distant than Sirius, would be considerably more brilliant than Venus if it were brought as near to us as a distance of 33 light years. It is a super-giant star and is 14,000 times brighter than the sun. Sirius, although 27 times brighter than the sun, has a little less than three times its diameter and is, like the sun, in the dwarf class. Capella, which is a yellow star of the same type as the sun, is a giant star. It has a diameter 12 times that of the sun and its mass, or the quantity of matter contained in it, is four times as much as that of our own sun. Antares, which is a red star, would be as brilliant as Venus at a distance of 33 light years, and is 3400 times more brilliant than the sun. Its diameter is 480 times that of the sun, but its mass, or amount of matter it contains, is only 30 times that of the sun. So, although a very large body, large enough to more than fill the orbit of Mars, its density is less than a thousandth of that of air at sea-level. It is one of the great super-giants, as are also Betelgeuse and Mira.

Among the dwarf stars, smaller even than the sun, is the faint star known as Barnard's star, which is one of the nearest to the earth. This is a red dwarf with a diameter only two tenths that of the sun, although its density is 45 times that of water! Most remarkable of all stars are the white dwarfs, such as the companion of Sirius, some of which are much smaller than the sun, but so heavy that a cupful of their substance would weigh several tons.

As to size, one will find that there are many stars in the heavens that are about the same as our own sun in diameter, that is, about a million miles more or less. They are also about the same in mass and in density, which for the sun is 1.4 times that of water. They are all classed as dwarfs, and, in general, they far outnumber the giants. Among stars visible to the naked eye there are more giants than dwarfs, because giants can be seen farther than dwarfs and so are selected out of all proportion to their actual number.

Giant stars are mostly red or yellow in color although there are also the great bluish-white, white, and yellowish-white giants, such as Rigel, Canopus, and Deneb Cygni, which are intensely hot super-giant stars. The yellow giants, such as Capella, resemble the sun in composition but have diameters that average ten times as great. They are much less dense, or lighter for their size, than the sun. This is true to an even greater extent for the red giants, which have diameters from twenty million miles to several hundred million miles in extent and densities less than a thousandth that of air. The temperature of the red stars, both dwarfs and giants, is very low—4500 degrees C, or less. Yellow stars such as our own sun average about 6000 degrees C, while the intensely hot, blue-white, and white stars have temperatures ranging from 10,000 to over 20,000 degrees C. These are surface temperatures. At the center of a star, such as the sun, the temperature runs into millions of degrees.

Our sun is not only a yellow, dwarf star, but is one of many millions of stars like itself in the Milky Way, or Galaxy, which encircles the heavens in a great band of milky light. It is composed of countless stars so distant that they cannot be seen individually—vast bright and dark nebulas, and great open star clusters, such as the Orion group and the Pleiades. It has been found that the Galaxy is a great, lens-shaped aggregation of stars of all kinds and types, which crowd toward a central plane the center of which lies possibly 50,000 light years from the earth in the midst of the star-clouds of Sagittarius. Its extent along its greater axis has been estimated, variously, anywhere from 125,000 to 300,000 light years. Our sun lies in what is referred to as a "local system" of bright Orion-type stars. This has the same elongated and flattened shape as the Galaxy but is inclined slightly to it. The sun itself is situated about 100 light years above the central plane of the Galaxy. It has been discovered that the whole Galaxy is in rotation like a huge wheel in which the inner parts rotate more rapidly than the outer. In the neighborhood of the sun it turns so as to make a complete revolution in 230 million years. This gives to the stars in our vicinity, and to the sun, a motion through space of about 190 miles per second.

As to the age of our sun an estimate by the British astronomer Jeans, which goes back to the time when it was a primordial nebula, is 8,000,000,000,000 years.

The planets Mercury, Jupiter, and Saturn will all be too close to the sun to be visible this month. Mercury is in conjunction with the sun on May 6, Saturn on May 8, and Jupiter on May 19. Venus is also close to the sun this month and will not be visible except low in the west immediately after sunset, near the end of the month. Mars is now high in the southeastern sky at sunrise. It passes from Capricornus into Aquarius during the month.

Conservation Comment

Through a joint declaration of policy and program the National Audubon Society and the Feather Industries of America, Inc., have taken a vitally important step toward checking the dangerous and illegal sale and use of the feathers of wild birds for millinery purposes. Public indignation aroused by the revelations contained in the National Audubon Society's publication "Massacred for Millinery" served notice on the millinery trade that such decorations on women's hats were unpopular. As a result dealers in feathers have promised to clean house, and to cooperate in securing effective legislation. The Audubon Society has done a fine job in bringing this matter to the fore.

We must point out, however, that this agreement lessens neither the necessity of continuing a watchful attitude, nor the responsibility of those who wear the feathers. One need only read the very able presentation of the dangerous conditions that, only a few months ago, were disclosed to the vigilant searchers for proscribed plumage, to fear that this sudden change of attitude by the dealers seems too good to be true. Some of us, whose memories still hold vivid recollections of the long and bitter struggle that preceded the passage of the laws whose violation by the trade made necessary the recent investigation, find it difficult to believe that victory can be so easily won.

• • •

Comprising about sixty square miles, the Boatswain Bay Bird Sanctuary has been set aside by the Canadian Government to provide protection for wild ducks and geese. The refuge is located on the coast of James Bay, the southern arm of Hudson Bay. James Bay is an admirable place for a sanctuary. Hudson Bay is shaped like a huge funnel, and through its small end are poured out each fall a goodly share of the waterfowl and shorebirds that have just been raised over many thousands of square miles of one of the richest bird nurseries in the world. The relatively recent building of a railway that now gives easy access to an area that was formerly almost uninhabited has brought fresh dangers to half a hundred dearly cherished species. We hope that more and larger sanctuaries may be established in this strategic area, for it is in such places that they are most needed.

• • •

There is an interesting conservation thought, as well as an educational idea, in the request of the Westchester County Conservation Association for contributions of mounted birds and mammals for use in visual educational work in the schools. Many species of our birds and mammals can hardly stand further inroads into their numbers for specimens, but it is felt that many homes—possibly in the attics—have mounted specimens that could well be doing a real service in school classrooms and museums. The suggestion of this New York organization could well be copied elsewhere.

• • •

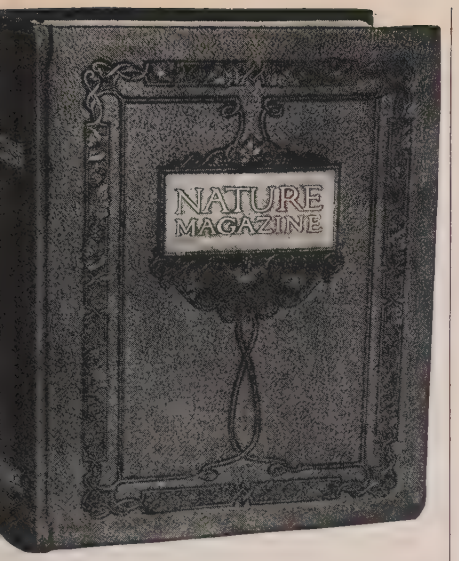
Despite the efforts of the National Park Service in Yellowstone National Park and the Fish and Wildlife Service at Red Rock Lake Sanctuary in Montana, the threat of the extinction of the trumpeter swan is serious. Carefully protected on their breeding grounds, the few more than a hundred adults leave these areas when the shallow potholes and lakes freeze up. They migrate to the valleys of Idaho and a corner of Utah along the Snake and Bear Rivers. Although they are specifically protected by law, either through malice or ignorance hunters take their toll, usually with the excuse that they thought the birds to be snow geese. The answer seems to lie in education, and to this end, with the approval of the Superintendent of Yellowstone, the Emergency Conservation Committee, 734 Lexington Avenue, New York City, retained George Marler, Ranger Naturalist at the Park, for a winter tour through this region. He has talked and shown pictures before a wide variety of groups. For this work the Committee announces that it needs a fund of one thousand dollars, saying that this "is a small sum to save ourselves from gnawing regret, and to save the trumpeter swan."

• • •

Giving an indication of the demands made upon our wildlife resources, the Fish and Wildlife Service announces the compilation of figures showing that more than 7,600,000 hunting licenses, or combination hunting-fishing or hunting-trapping licenses, were issued during 1939, the latest year for which figures are available. For these almost $13,000,000 were paid, which sounds like a lot of money until it is considered in comparison with the value of the wildlife destroyed. A total of 1,111,561 federal migratory bird stamps, or duck stamps, were sold in 1939, an increase of about 100,000 over the previous year. The number of hunters continues to increase, which is more than can be said for the numbers of most species of the birds and mammals that are hunted.

• • •

The way has been cleared for the extension of the Federal Wildlife Refuge program to Colorado through the invocation of a 34-year-old state statute that gives consent "to the acquisition by the United States, by purchase, condemnation or otherwise, of any land in this state required for custom houses, post offices, court houses, arsenals or other building whatsoever, or for any other purpose of the government." Albert E. Sherlock, Denver attorney, brought this to the attention of the Attorney-General of the State and obtained a ruling that opens the way to the purchase of lands under consideration. (Continued on page 288)



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More Stumps

We thought we were writing *finis* to poetic opinion as to the relative charm and significance of stumps with the publication of three poems in our April issue taking issue with L. L. Thompson's original poem in the February issue. However, two additional poems have come in and they are too good to consign to the permanent obscurity of the correspondence file. So we will let Mrs. Mary Breck of Washington, D. C., have her word on stumps, as follows:

Stumps are lovely things
Standing in the sun,
Graphs of forest history,
Now their day is done.

Stumps are faery things
Entwined against a shore,
Swaying in the water there;
Swaying as of yore.

Stumps are grand old things
Like aged men, and worn,
Giving us a surety
That beauty once was born.

The other rebuttal comes from Cecil Clayton Sargent of Salem, Oregon, who entitles his verse "I See Beauty in a Stump" and writes:

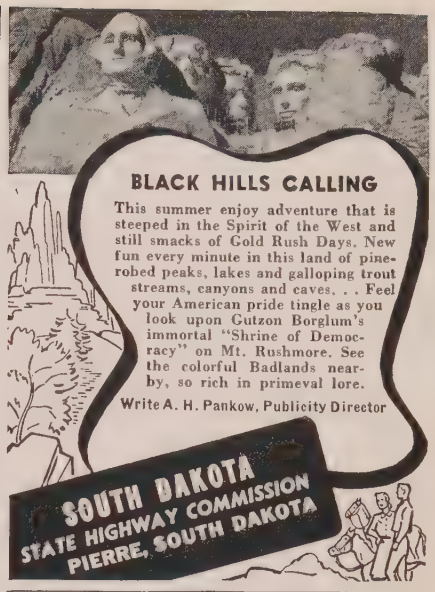
I see beauty in a stump—
the wind
and rain,
old scars!
fierce storms!
the wars it knew!
its victories!
its living years!
its death!
I see beauty in a stump
and bravery!
I cannot see defeat!

With these we solemnly assert that this *does* settle the matter.

BUSY SQUIRRELS

By DR. C. R. SCHOLL

At "Whispering Norways", the name given to our home, at Reading, Pa., because of the setting of Norway maple and spruce, we have a summer house detached from the main building and used for a smoke house, for baking, the making of apple butter and similar purposes. Recently, seeking to remove a box from the high shelf there I was deluged with a shower of walnuts in the hull. Busy squirrels had completely filled the space of the wide shelf back and above the containers and bottles. Curious as to the extent of this cache I crept into the loft above by way of a trapdoor, and found, piled against the sloping chimney, a bushel of receipts and other discarded stationery. These were all so charred that they fell apart when handled, and why they had not burned and sent the whole house up in flames is a mystery. In a lean-to at the rear of the little house tools are stored, and on a crosspiece above were some laths. Every storage space there was also packed with walnuts. All in all, enough provender had been set aside to care for a regiment of squirrels during a hard winter.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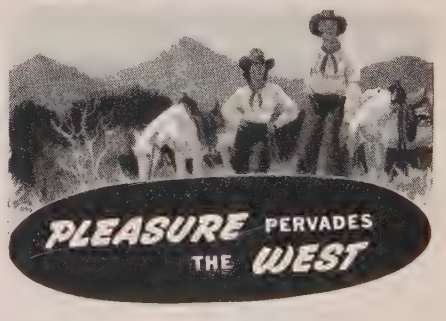

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Forty double-size stamps covering twenty different subjects will be issued in the fourth annual series of Wildlife Conservation Stamps brought out by the National Wildlife Federation. These will be sold during Wildlife Restoration Week, April 14 to 19. In addition to the stamp series, the Federation is bringing out an attractive album containing descriptive matter. One feature of this album will be a large seven and one-half-inch-square colored picture of wood ducks to be mounted on the cover. Both stamps and albums are sold through clubs, associations, schools and other organizations, or direct from the National Wildlife Federation, 1212 Sixteenth Street, Washington, D. C. A sheet sells for one dollar. Two sheets, two albums and two wood duck pictures are offered for $2.00, and one sheet, one album and one wood duck picture for $1.50. Funds derived from the sale will be used to aid in financing the work of local groups aiding the stamp distribution, and the national organization. As in past years, these stamps have an appeal to collectors as well as to conservationists.

A most recent highway proposal is to build a parkway into Bear Mountain Park from George Washington Bridge, a plan that has the approval of the Palisades Interstate Park Commission of New York and New Jersey. It appears that this plan has been under consideration for some time, and now seems to be approaching probability. It is properly criticized by Stanley M. Isaacs, President of the Borough of Manhattan, as a sacrifice of rustic beauty. He asserts that the commissioners will be faithless to their trust to permit the further exploitation of the Park. The plan is defended by George W. Perkins, Vice-President of the Commission, on the ground that the Park should be made accessible to the millions who could enjoy it if it were accessible. It appears to be a question of whether Bear Mountain Park was set aside to preserve a remnant of wild area in the East or whether it was designed to become a picnic ground. With the great recreational development of parks and beaches close to New York City it would appear unnecessary to sacrifice this Park in any degree.

●

BAG LIMIT ON TREES

Americans, fortunately, have seen fit to establish closed seasons and bag limits on game. Such rules are necessary if we are to preserve our wildlife from indiscriminate slaughter and extinction.

Civilized man, in fact, has found that to live in association with his fellow men he must have rules. Thus we have established rules for the protection of life and property, sanitary laws, speed laws on the highways, and other rules of conduct and practice designed to promote the public welfare and safeguard the common interests of all. We recognize their rightness.

But the forests of the nation, except for those in public ownership, are still subject to no rules that will prevent their destructive exploitation. Without restriction, a timberland owner may wholly liquidate or destroy the forest growth on his land, regardless of the fact that what he does may increase the flood danger to homes and towns a hundred or more miles away, or may undermine the economic support of local communities.

It is high time we had a bag limit, so to speak, on trees. For a century and a half, wasteful, destructive exploitation of the Nation's forest resources has gone on unchecked. And although some progressive leaders in the forest industries are now attempting to change their operations from the old cut-out-and-get-out system to a system of sustained yield, by and large destructive forest exploitation still goes on today.

The timberland owners are not entirely to blame. They operated according to the rules, or lack of them, that obtained. They took the risks of a business that grew up in the traditions of transient operation and quick liquidation, and they had to make returns on their investments or go under. It is the public rather that is largely to blame for not having long ago established more adequate rules to protect a basic resource.

Three-fourths of the nation's forest land is in private ownership, and these privately owned lands include the most productive and most accessible areas. Regardless of ownership, the public has a big stake in all forest lands; it is essential that they be protected and properly managed to help reduce flood disaster and erosion, to help maintain the navigability of rivers and harbors, and to insure a continuing supply of raw materials necessary for industry and employment and for national defense.

In its last annual report, the United States Forest Service recommended a program that should go a long way toward preventing misuse and abuse of forest lands and insuring the perpetuation of the nation's forest resources. Increased federal aid to private forest land owners is called for, to help them protect and manage their forests for continuous production; but as a contingency of such aid and as a guaranty that the expenditures will not be wasted, the report recommends some system of public regulation of timber cutting that will assure forest lands being left in reasonably productive condition.

The regulatory measures recommended to maintain the permanent productivity of our forest land are not excessive. They include precautions against fire, insects, and disease, and certain requirements in cutting practice that will promote future timber growth on the land. Beyond these requirements in the public interest there need be no restrictions on free private enterprise.

Two bills, introduced by Congressman Walter M. Pierce of Oregon, are now before Congress looking to nationwide regulation of cutting and certain other practices on privately owned forest lands of the United States. These bills (H. R. 3849 and H. R. 3850) propose alternate plans, one following the recommendations of the Forest Service and the Secretary of Agriculture for a joint federal-state regulatory set-up, and the other providing for direct federal regulation. Either plan, we believe, would be a long step forward in forest conservation. The important thing is that the Congress act promptly and effectively to put a stop to destructive liquidation of the Nation's forest resources—that we have a bag limit on trees.

ALCHEMY IN THE GARDEN

(Continued from page 283)

but if colchicine is used on the 16-chromosome plant, the two will mate and a cross will result which *may* result in interesting and valuable new hybrids.

But do not dash out into the garden and start spraying your flowers with colchicine with the expectation that you will become a Luther Burbank overnight, for you will not. In the hands of a skilled geneticist, colchicine is a valuable tool, but not all of them use it, and those who do are careful about its use. For if you do not understand its use you will simply waste time, money and plants—and if you happen to get some in your eye you may go blind! However, a new lily that may be the basis of a $3,000,000 American crop has already resulted, and new marigolds, and a number of other useful new varieties of other plants.

Plants require vitamins just as animals do. But they make their own if conditions of soil, etc., are favorable. Vitamin B_1, which has been so widely advertised as a cure-all for plant ailments, is found in most normal soils, in yeasts, molds, humus, and in barnyard manure. If I could believe all the testimonials I have read from amateur gardeners as to the results they have obtained by using vitamin B_1, I would like nothing better than to give it a big boost here. Not that I doubt that these enthusiastic amateurs are sincere, or that some of them with vitamin-deficient plants or soils are actually getting results. But the reports of most scientific investigators are negative with vitamin B_1 used in experiments where there are proper checks and controls. The outstanding exception has been one institution in California, where the soils are sandy and perhaps more deficient in organic matter than in more humid regions. Also the climate there is different; and I fear, too, that either California optimism or the proximity of the movie colony may have had a certain influence on the promotion behind vitamin B_1 in its early stages. (It worked that way with hydroponics—tank farming—before the moonshine was strained out of it.) That there may be a definite place for vitamin B_1 in horticulture, no one denies; but conservative scientists tell us to go slow, experiment if we like, but do not expect too much from it. If your soils and plants are deficient, just as little Willie may be, vitamins will help them; but unless they need it, it is a waste of time and money to buy it for them.

In sand cultures, for transplanting, and for use in certain soils and climates, it may well be that vitamin B_1 may prove invaluable, but we do not know enough about it yet to make it a routine part of our gardening technique. It does not cost much to try any of these new things (except colchicine which is around $20 an ounce), since they are used in extremely dilute solutions, so go ahead if you want to experiment. You will have fun and maybe learn something. But if you want your experiments to carry weight, use untreated check plants or plots as controls, and keep accurate records of all that you do.

The so-called harvest fruit spray comes close to being one of the "wonder-working chemical mixtures" that Dr. Clark of Cornell warns growers to avoid. To quote H. B. Tukey of the New York Experiment Station at Geneva, in an article in *Garden Digest*, "No witch could have brewed a more fantastic concoction than the spray that fruit growers are using to cause apples to hang better to the tree and avoid the pre-harvest drop that in some seasons and with some varieties is so serious." It takes only five parts per million or one ounce in approximately 1400 gallons to do the trick, using two white powdery chemicals (naphthalene acetic acid and naphthalene acetamide). The cost is about 40 cents per tree and if you save two or three bushels to the tree worth $.50 to $1.00 a bushel, it is certainly a good investment. While still somewhat in the experimental stage, this method has worked in half a dozen states to a degree that indicates that it will soon become standard practice for the commercial orchardist, as well as for the home fruit gardener.

I wish it were possible to report that the bug fighters had made as much progress as the chemists in other fields, but while they have learned a good deal about how to mix and apply insecticides in more effective ways, no synthetic substitute for arsenate of lead that is widely applicable has yet been developed. Rotenone, pyrethrum, and nicotine still lead the list of vegetable poisons, and it is interesting to note that Kenya in Africa has taken away the pyrethrum business from the Japanese, because they can not only produce the daisy-like flowers more cheaply, but also the Kenya product is higher in its toxic content, averaging as high as 2 percent pyrethrin. For the pestiferous Japanese beetle, the best to date seem to be repellents, and the introduced disease that is beginning to catch up with it in heavily infested areas.

A good deal has been learned here and abroad about the use of chemicals to control weeds in lawns, pastures and fields. While this is still more or less experimental in some phases, it is standard practice in certain areas of the West, and as previously indicated, is coming into use in the East. Properly applied, chemical weed killers are already a valuable aid to the gardener, especially those with large areas of lawn to keep free from crab grass.

Trailside Museum

To provide new opportunities for Nature recreation a trailside museum will be established by the Union County, New Jersey, Park Commission in the Watchung Reservation this year, with official opening scheduled for May 3. Five county Nature organizations are cooperating in this activity—the Elizabeth Nature League, the Nature Clubs of Roselle Park and Watchung, the Westfield Bird Club and the Plainfield Mineralogical Society. These groups will share the responsibility of providing exhibits and will aid in supervising the museum.

Higher Mathematics

The Stereographic Projection. By F. W. Sohon, S. J. New York. Chemical Publishing Company. 1941. 210 pages with diagrams. $4.00.

Written by the Director of the Seismological Observatory at Georgetown University, this is a book for the advanced student, for the cartographer, and the student of the complex variable.

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THE SCHOOL PAGE ★★★

EDITED BY DR. E. LAURENCE PALMER
Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

A Delightful Contagious Disease

Some years ago, I got off a boat one morning in Honolulu. In a day or two, I was to teach some classes in Nature study at the University of Hawaii. For years, I had advised teachers to take their students into the field and teach them there from what happened to be available. As I walked about Honolulu, I began to look to see what luck I should have if I took classes there into the field under similar circumstances. It was tremendously discouraging because most of the plants that grew in such profusion were almost total strangers to me, even though I had taught in the warmer parts of southern California. Then, when I saw my two huge sections of students, I was almost floored. How could I possibly take eighty students on a field trip among plants that were total strangers to me?

While the rest of the family tried to learn to ride a surf board at Waikiki and the rest of the faculty and student body took off the afternoon for rest and refreshment, I worked as I had never worked before. A hurried collecting trip along one side of the quadrangle, a dash out to the Bishop Museum and hours of digging in manuals helped keep me one jump ahead of at least a small number of the class. But this became more and more tragic as the season advanced. I might learn the name of a spectacular plant as it was given in the botanical manual but when I suggested this name to the class I was deluged with a lot of other names. One said the Hawaiians called it one thing; another gave a Chinese name for it and still another said that the Japs called it something else.

Where could I find help? A number of times when I did not myself have classes I visited the botany and zoology laboratories only to find them locked. They said it was rather warm in Honolulu that summer but I knew nothing of that as I had much more to worry about. I envied my fellow visiting faculty members who were teaching courses in professional education and who could use in Hawaii the same lectures they used on the mainland. But I had to use local objective materials or change my philosophy of Nature education. If I resorted solely to the lecture technique I was, in my own eyes at least, sunk.

I found the saver of my life not in the Bishop Museum, or the biology laboratories of the University, or in the library, but in the persons of at least three amateur naturalists. One of them was a business manager of a department of the University but he had been reared in the islands and he had roamed the hills of Oahu from sea-level to its highest point. Moreover, he was generous with his time. Furthermore, his identifications checked invariably with what the books showed and with the legends on specimens in the Bishop Museum. He was a real amateur outdoor naturalist with a hobby centering particularly around the famous land shells of the island. I shall always be grateful to him for the help that he gave me. His modesty was such that I should prefer not to mention his name here, because modesty seems to be one of the splendid characteristics of the average amateur naturalist and I should prefer not to offend him or embarrass him, and I enjoy the letters that have come to me from him annually for the last decade.

Since that summer in Hawaii, and before it, I have had occasion to meet many people who call themselves amateur naturalists. Most of them are modest about their hobbies but also most of them enjoy sharing their joys with others. Their enthusiasm becomes really contagious once you have broken down the barrier some of them erect about themselves. We need more of their kind in the world no matter what the political future of civilization may be. Many of them are making thoroughly dependable observations which may help in the advancement of science and many people who are bored with life would find a new purpose for themselves could they develop a useful Nature hobby. A few of these hobbies might be worth considering.

This is written just as I am on the eve of a shell hunt which will take me to Florida and Cuba. I expect to spend a few days on a famous Florida island where shell hobbyists grow on every sand dune. Out of a host of these I can think of one whose financial status is such that she could do anything she wished. Instead of doing what many of her associates do with their leisure, she spends a regular portion of her time in one of the great museums of the East and has become an authority in her field. Another has made herself not only an authority as the author of a superior book but is continuing to pry into the secrets of living shell-fish.

A few years ago the late Albert Brand found himself young and yet independent financially. He developed a hobby of making records of bird songs. As a result we have those records for use by us all, since he called upon the support of Dr. A. A. Allen to help him on the bird angle, and Dr. P. P. Kellogg and others to help on the engineering side. I know that he died gloriously happy over what he had done with that hobby.

Other hobbyists and their hobbies who should be mentioned here would include Ralph B. Lutz, an oil refining engineer of Philadelphia who boils over with enthusiasm when he tells you of his experiences banding bullfrogs. Other "banders" would have to include the school teacher, Dr. Marjorie Ross of Ithaca, New York, who bands peepers, turtles and salamanders, and Curator Roger Conant of the Philadelphia Zoological Garden who bands snakes even though they lack hips. Fish banders are too legion to even be considered here, and we have those who tie crazy colored feathers to birds and then let the excited populace report their whereabouts in the press.

One of the most interesting bird hobbies is that centering around the revival of interest in falconry. Among the hobbyists to be mentioned here would be the Craighead brothers of Washington and Captain Meredith of New Jersey.

Reptiles always have those who are interested in them but not all of these people carry their interests to a point where they help science. This can hardly be true of the rattlesnake enthusiast, L. M. Klauber, an engineer graduate who makes his living as Vice President of the San Diego (California) Gas and Electric Corporation. Sometimes it is difficult to recognize the amateur and professional status of these Nature hobbyists. This would certainly be true of Al Pfleuger, the taxidermist of Miami, Florida, who is one of the best guides in that region for visiting professional naturalists.

There are of course plenty of plant hobbyists. It is absurd to assume that any list might include all of them or even the best. I must mention, however, the hobby of Robert S. Lemmon, editor of *Real Gardening*, who works his spare time learning how to raise wild flowers from seeds. Then, we have the fern and orchid "cranks," whose ambition it may be to get color photographs of all the ferns and orchids within driving distance of their homes during the proper season. I spent one day with one of these men a year ago and wish many of my professional botanist friends could have seen the care that was taken to be sure that the plant was left undisturbed in its natural setting. Herman Forster, Assistant Commissioner of the Department of Water Supply of New York City, is one of these orchid chasers, but so far it has not been my privilege to work with him in the field.

George R. Hemingway, of Boyne City, Michigan, has an idea that it would be worth while to get children to adopt little trees and to keep diaries of those which they set out. He is riding this hobby hard and we wish him every success.

Another tree hobby is being developed along interesting lines by Dr. E. E. Wildman, late of the public school system of Philadelphia. Dr. Wildman takes records of the years' growth of trees by rubbing a colored crayon over paper placed on the cross section of old timbers. Having done this, he sets out to date the years or to interpret the weather when the trees grew and to check his notes with weather recorded by such early observers as Benjamin Franklin. Who can tell what may result from hundreds and thousands of people's learning to make such worth-while observations on the living things about them?

There has been some effort to coordinate the work of these amateur naturalists. W. Stephen Thomas, Executive Secretary of the Committee on Education and Participation in Science of the American Philosophical Society, has been taking this coordination seriously. He and his associates are now laying out jobs that may be done by these amateurs. These projects vary from observing radio reception to the construction of telescopes and the recording of pollen-bearing of local wild flowers. He reports some 3899 of these hobbyists as members of thirty organizations with the interests divided about equally, to include those interested in plants, those interested in animals, those interested in physical science, and those with highly general interests. If this page can be of assistance in further coordinating the activities of these people, its services are gladly offered. Such cooperation would only slightly compensate for the many ways in which amateur naturalists have helped the writer wherever he has been in the past. Amateur Naturalistitis is a contagious disease well worth having.

NATURE IN PRINT

As a convenience to readers the books reviewed in the pages of Nature Magazine may be ordered through the book department of the American Nature Association, 1214 16th St., Washington, D. C.

(Continued from page 247)

awareness of wild things. His novel *Still Is the Summer Night* has an opening paragraph describing the experience of identifying a broadwinged hawk; his novel *Bright Journey* opens with a scene in which gulls and shorebirds are prominent; and his poems find many of their subjects from things observed in the outdoors. Yet to me *Village Year* emphasizes less Mr. Derleth's leanings as a naturalist and more the opportunities of his small-town way of living. I see in it, as in my "exploratory" college verses, the evidence of the adventures just outside the door—if the door opens toward the countryside.

Village Year, it should be made plain, is not the sort of journal called a Nature calendar. Its main interest for many readers—as perhaps for its author—is the life of the village with its well described characters whose memorable sayings are faithfully recorded by the young writer with a notebook—Mrs. Stolz, for example, who when confronted by a house-to-house perfume salesman "stiffened and said with some dignity that she did not much care for perfumes. 'I like my own smell best!' " Yet the book's assured interest for readers concerned primarily with Nature is apparent in the references I have already cited and in the many poems included, one of which should be quoted.

"I sat on the sandy bank under a cottonwood tree," Derleth records, "and wrote *Fifth Month Morning.*

Cottonwood leaves quiver and bend in the
east wind, and chewinks call.
Here on the river's edge the maples hold the
age of fall
in early garment; the birch trees,
yellow still with catkins, draw the bees,
and mourning doves cry and cry,
with the early sun on their breasts,
and no cloud in the sky."

Children of the Sea. By Wilfrid S. Bronson. New York. Harcourt, Brace and Company. 1941. 264 pages, with many illustrations by the author. $2.00.

Wilfrid Bronson has proved his ability before to weave natural history fact into a story and he has done it again successfully in this book. Here we have the story of a dolphin and its friendship for a boy dwelling on the island of Nassau. Around this central theme is massed fascinating information about sea life. The author writes charmingly and with authority, and not the least allure of this book lies in the delightful illustrations. Designed as a story for children, this tale will be equally fascinating to adults.

For Star Gazers

New Handbook of the Heavens. By Hubert J. Bernhard, Dorothy A. Bennett and Hugh S. Rice. New York. Whittlesey House. 1941. 299 pages, with illustrations and maps. $2.50.

This is a new, completely rewritten and enlarged edition of *Handbook of the Heavens* by the same authors. It is an excellent popular astronomy for the average individual interested in the heavens and their study.

Flower Fixing

Arranging Flowers. By Margaret Watson. New York. The Studio Publications. 1941. 64 pages, with profuse illustrations. $1.50.

Some do's and don't's on flower arrangement by one of the foremost artists in this field. Informal and brief text accompanies each carefully-selected illustration of the right and wrong in displaying flowers.

On Nut Growing

Nut Grower's Handbook. By Carroll D. Bush. New York. Orange Judd Publishing Co. 1941. 189 pages. Illustrated. $1.75.

The subtitle of this book is: "A practical guide to the successful propagation, planting, cultivation, harvesting and marketing of nuts". This is amply descriptive of the contents of the book, the author of which has devoted years to practical experience with his subject.

Among the Eskimos

Kabloona. By Gontran de Poncins. New York. Reynal and Hitchcock. 1941. 399 pages plus illustrations. $3.00.

In the Eskimo tongue the title given this book means "the white man". This is a true story of the author's experiences with a small band of twenty-five Eskimo men, women and children who live the primitive life of their race on vast King William Land. In collaboration with Lewis Galantiere the author has given us a vivid story into which he brings a detached philosophy of civilized life as he views it from this far viewpoint. The book is based upon the diaries and notes made on the ground and not upon M. Poncins' recollections when he had returned to the comforts of our way of life. The result is fascinating.

Wildlife Book

American Wildlife. By the W.P.A. Writers' Program. New York. Wise and Company. 1940. 749 pages, with 327 photographs and six color plates. $3.50.

Working with various individuals and agencies concerned with natural history, the W. P. A. Writers' Program has compiled a Who's Who of the mammals, fishes, reptiles, amphibians and birds of North America. The treatment is entirely popular and in many cases quite superficial, with life history data varied in value and quantity. The illustrations are excellent and the text readable. A greater uniformity of information about the species covered would have made the book more valuable.

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ON THE RECORD
By "Disc"

When we appended a postscript to this department in our January issue—in which we chose ten records we would wish to take with us to a desert island—and suggested that our readers might like to try the selection of ten themselves, we had no idea that choosing the best lists, and the reasons therefor, would be so difficult. It was far harder than picking out our own best ten. However, after much weighing of the entries, we are happy to announce that the awards of the album, "The Heart of the Symphony", have been sent to Elsbeth A. Smith, Concord, New Hampshire; Madeline Adams, Dockton, Washington, and Leonard A. Phillips, Hammond, Louisiana.

We should like very much to make the same awards to several other entries, but we will have to be content with congratulations. The following were in on the final judging: Angeline Fierstos, Canton, Ohio; Mrs. Paul H. Graves, Gruver, Iowa; Arline Shaw, Cohoes, New York; Lillian M. Reed, Albany, New York.

Space does not permit printing the three winning entries in their entirety, with the reasons for selection. However, the selections themselves are interesting. Miss Smith visualized the various moods in which she would be likely to find herself on this desert island and made her choices accordingly. She would take along Mme. Schumann-Heink's recording of "Die Lorelei," "The Ride of the Valkyries"; Mozart's "Symphony #40 in G Minor"; Prelude to "Tristan and Isolde"; "Finlandia"; Debussy's "L'Après-midi d'un Faune"; Sibelius's "Valse Triste"; Schubert's "Serenade", and Tchaikovsky's "The Nutcracker Suite".

Mrs. Adams writes that she went through many "painful partings" in cutting her list down to a mere ten. However, she feels that one could ask little more than to be marooned with Beethoven's "Pastoral Symphony"—an album. To this she would add: an album of "Pinafore"; Brahms' "Sixth and Seventh Hungarian Dances"—two records; "The Highland Fling", recorded with bagpipes by the Sutcliffe Troupe; Lawrence Tibbett's recording of Wagner's "Evening Star" from Tannhäuser; "The Green-eyed Dragon", recorded by John Charles Thomas; "Danse Macabre" (for ghoulish moments); "The Stars and Stripes Forever"; Schubert's "Ave Maria" as sung by Marian Anderson. We think Mrs. Adams certainly earned the right to take "The Heart of the Symphony" along, too.

Mr. Phillips would take in his baggage the following: "Dance of the Hours", from "La Gioconda"; "Ave Maria" as sung by Rosa Ponselle; Dvořák's "Symphony No. 5 in E Minor"—two records; "Hearts and Flowers"; "Blue Danube Waltz"; "Echoes of Spring"; "Babes in Toyland"; Kate Smith's singing of "God Bless America". For his final recording he had a difficult time leaving "Finlandia", and finally picked the Heavenly Gospel Singers' rendition of "When the Gates Swing Open" and "Cheer the Weary Traveler".

We have heard the saying often that it is a difference of opinion that makes a horse race. Certainly opinions differ as to the selections for the hypothetical island sojourn,

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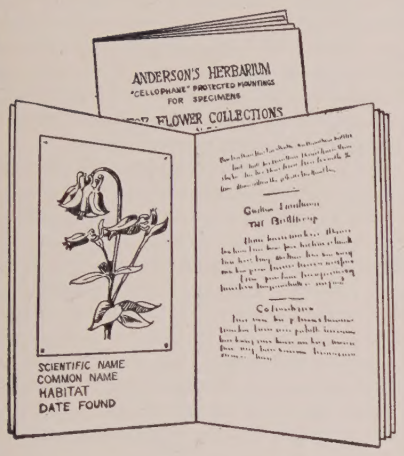

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which, we suppose, must mean something. Anyway, there is no evidence of regimentation of musical choice. "Ave Maria" proved the most popular selection, with "The Blue Danube Waltz" and "The Stars and Stripes Forever" as runners-up.

We wish to thank all those who entered the contest for their interest and for the careful thought given to their entries. Even though they were not productive of awards we hope that the mental exercise involved was pleasurable.

•

A recent recording of interest to those with both Nature and musical enthusiasms should be Debussy's "The Afternoon of a Faun" (Victor 17700) recorded by the Philadelphia Orchestra under the direction of Leopold Stokowski. Miss Smith, our successful contestant, chose an earlier recording of this for her island trip.

•

Dances, chants and songs of Hopi, Zuñi, Navajo, Taos, Mohave, Papago, Pima and Apache Indians are recorded on the discs in a new album—Victor P-49. This work was done by Mrs. Laura C. Boulton, seeker of the exotic and extraordinary in music, and she has found among our American Indians documentary material of this sort comparable to that preserved in the remarkable album of African tribal rhythms that Mrs. Boulton captured on wax a bit more than a year ago.

THE SECRET IN THE OAK SAPLING

(Continued from page 280)

high on the branch of an oak, carried him back to the home site, and tucked him in.

Next morning all were in the nest, but a little later I found Discontent in the tree top of his home. A while later all had left the nest. I had thought it would be nice to have a photo of them as they left, but I was too late.

What long sighs of relief the parents must have breathed when all their young were in the tree tops far from human hands. Three little birds had joined the world of happy songsters and insect destroyers.

Training the Dog

Training the Dog. By Will Judy. Chicago. The Judy Publishing Company. 1941. 160 pages, with drawings. $1.50.

This is the sixth edition of this popular book for dog lovers and owners. Its practical value is proved by its popularity. The author's dedications of each edition are delightful, this latest being dedicated to "General Judy, a doberman who thinks that life isn't worth living unless it is lived with me."

For Bird Notes

Ornithology Laboratory Notebook. By Arthur A. Allen. Ithaca, New York. Comstock Publishing Company. 1941. Fourth Edition. $3.00.

The value of this publication for recording observations made in the field and for studies made in the laboratory on the birds of North America has been amply proved since its first publication in 1936. An important part of any bird student's library.

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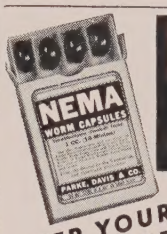

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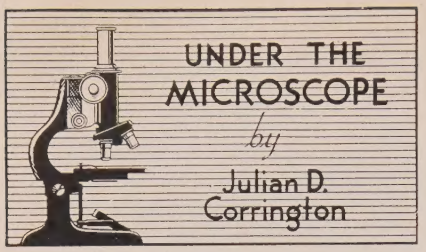
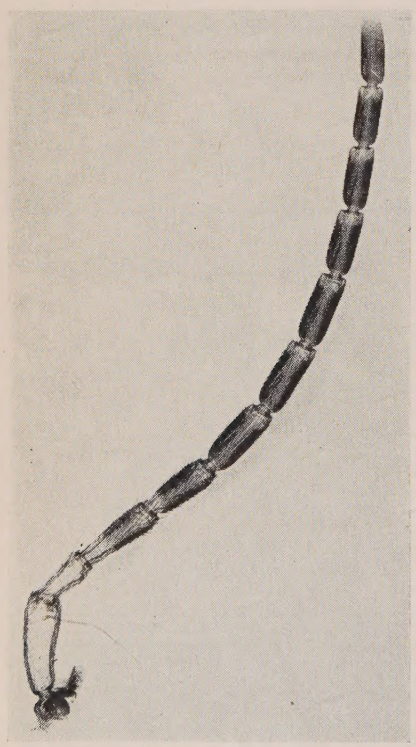


Insect Antennae

To the microscopist whose chief interest lies in textiles, diatoms, crystals or other non-zoological field, the making of whole mounts of insect antennae would seem an extremely simple act, devoid of aught but passing concern. However, there is more to this subject than meets the eye—especially if we will augment said visual organ with the eye of brass and glass. Let us see what can be gleaned from the detailed survey of a small side line of this nature.

All insects have one pair of feelers or antennae, hence this feature constitutes one of the characters by which the Class Insecta is defined. They arise symmetrically from in front of or between the eyes, and consist of a number of joints. The primitive type is the *setaceous* (bristle-like), as in the cricket, in which each segment is successively smaller so that the whole feeler tapers to a point, but Nature has played many variations on this generalized theme.

One line of development into distinctive types reverses the tapering. The *filiform* (thread-like) antenna has a uniform diameter from base to tip, with all joints of approxi-



FILIFORM ANTENNA OF THE GROUND BEETLE, *HARPALUS*

mately the same size. *Clavate* or club-shaped antennae are progressively thicker toward the tip, while *capitate* ones end in a pronounced knob or head. The most highly specialized member showing this form of variation is the elbowed or *geniculate* feeler, characteristic of ants and weevils. Here the basal segment is very long, while the remaining ones, clavate in form, bend away from the basal joint (the scape) at a decided angle, and constitute collectively the flagellum.

Quite different is the tendency to produce side branches. The *moniliform* antenna has rounded segments of more or less uniform diameter, the whole resembling a string of beads, while in the *serrate* (saw-toothed)

RINGED ANTENNA OF HORSE FLY

form, each joint is produced along the inner side only, giving a notched or zig-zag outline. When such an outgrowth becomes pronounced so that the inner margin resembles a comb, the condition is known as *pectinate*. The familiar antennae of males of such large moths as the Luna are *bipectinate*, with combs along both sides, and in the male mosquito the outgrowths are so very long and fine that the type is referred to as feathery or *plumose*. Most elaborate of antennae in this grouping is the *lamellate*, where the tip is provided with several large, movable plates.

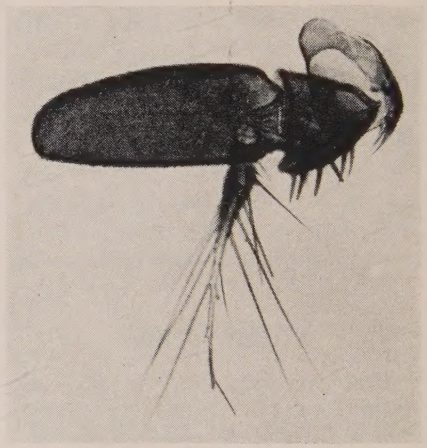
MOUTH PARTS AND LONG-JOINTED FILIFORM ANTENNA OF SQUASH BUG

Among higher families of flies a third tendency is noted. In these the few, usually three, basal segments are well developed and normal, but then the remaining joints are suddenly very much smaller and more slender (*stylate* type) or even appear as a mere bristle upon the larger stump (*aristate* antenna). The arista or bristle may be terminal in position, or the last large segment may grow out beyond the insertion of the arista, when the latter is referred to as dorsal.

Antennal types are important in insect classification, especially in flies and beetles. One may assemble a most interesting collection of slide mounts of these structures from beetles alone. Aside from type, there is also much variation in number of segments, length of individual segments, which are very long in bugs, and in size of the whole. External parasites, as fleas, have greatly reduced feelers, since they would be in the way and are not especially needed. Also in insects with highly-developed vision, as dragonflies and true flies, where the compound eyes are enormous, the antennae are correspondingly minute.

And this naturally brings up the question of the function of these variable structures. Older naturalists asserted that the antennae were solely tactile, that is concerned with the sense of touch. This seemed obvious enough from their shape, location and use. What was not apparent because animals such as insects were in those days compared with man was the presence of olfactory (smell) and sometimes gustatory (taste) sense organs on the antennae in addition to tactile hairs.

With the rise of experimental zoology in our own times, scientists began to take nothing for granted and to cease drawing definite conclusions because of some fancied or apparent similarity to human organs. The insect is a profoundly different sort of animal than the human species—as highly developed along his own line of destiny as mankind among the vertebrates. Only the most general of comparisons is permissible. For example, detailed structural studies had for some time made it certain that the compound eye of the



ARISTATE ANTENNA OF HOUSE FLY

insect, while a visual organ, formed a quite different sort of picture from that produced on the human retina. It was determined to be a mosaic, best adapted for perception of motion. The experimental method, however, uncovered some hitherto entirely unsuspected facts, for instance that insects do not respond to the same range of the visual spectrum of light as we do. Bees will not react to black, grays or reds, but perceive ultra-violet.

Cutting off the antennae is the easiest procedure in studying their functions. Bees, marked with a daub of paint so that they can be recognized, are first accustomed to a small box containing a vessel of sugar water, then a scent such as rose is added. When the bees have become used to this scent, a number of identical but unscented boxes are added. These will be ignored, the insects

This department is published as a service to our readers interested in this specialized subject. Its editor is at your service to answer questions on specific problems. He also invites any suggestions as to the inclusion of material that any reader considers valuable. Write to Dr. Corrington.

ntinuing to visit only the perfumed coniner. If the odor is switched, say to helioope, the bees will not enter such a box but ill continue to search for the one with a se scent.

Removing the terminal eight segments of th antennae deprives the bee of his sense f smell and he can no longer find the rosented box. As a control, some bees were ained to find the sugar water by a visual imulus, the right box being colored yellow, r example. Then their antennae were cut ff; but they still found the sugar without ifficulty, proving that the nervous shock of ie amputation was not responsible for the ailure in the first experiment.

A female of one of the big silkworm oths, such as the Polyphemus, Cecropia or una, may be exposed on the sill of an open indow on some warm evening in late spring r early summer, restrained within a small ox of netting, gauze or screening. In the orning many males will be found clustered ver the box. If some of these are marked ey may be shipped or taken by car to a conderable distance and liberated, whereupon me of them will show up again the next orning, having conquered many miles to eep the tryst with their lady love. How did ey find their way back? It was believed at the female emitted odors to attract the ales, and this is indeed true, as proved by xposing an empty box that had previously ntained a female and finding males gathred about in the morning. However, many vestigators have postulated in addition the mission of waves akin to radio by the feales, since the distances are sometimes so reat and the male antennae so large and mplex. The last word has not yet been said this problem. If the reader is so inclined e may repeat these interesting experiments ithout difficulty and may think up other id original ones on the same or different pics.

As for technique, the specimens are killed an alcohol or a cyanide bottle, then the ntennae removed with a fine scissors, taking re to cut off the complete structure. After eatment with a strong alcohol for 10-15 inutes, then a clearer for a like period, the naller and more transparent examples are ounted on a slide in balsam. Examples: 5% alcohol, 10 mins.; 100% (absolute) cohol, 10 mins.; xylene, 10 mins.; balsam. , after 95% alcohol, carbol-xylene, 10 ins.; balsam. Or use dioxan or cellosolve. The larger, heavier, darker-colored and re opaque antennae should first be potash-, as described in detail in this department the November, 1938, issue.

Beginner's Primer

Of the hemimetabolous insects—those in hich the larval stage, termed a naiad, is quatic, while the adult is aërial—there reains for discussion the prominent Order donata, containing the dragonflies and damlflies. Everyone knows the dragonfly. Your unt Sophia probably called them darning edles, although they do not sew up chilen's ears as she may have believed, and Old lack Joe knew them as snake doctors, deite the fact that they are unable to perform iracles of resurrection upon deceased serents.

Members of this order have two pairs of embranous, net-veined wings, the hind ir being as large as or larger than the forewings; chewing mouthparts; incomplete metamorphosis. At about the middle of the front margin of each wing there is a joint-like structure, the nodus. The habitat of the adults is typically over or around the margins of bodies of water. Two suborders.

The Anisoptera, or dragonflies, are large insects whose expert airmanship never fails to win admiration. Hawking by day, they beat ceaselessly back and forth over ponds and marshes, often at amazing speeds, and perform a most valuable service in destroying great numbers of noxious insects including mosquitoes and other small flies. The group is a compact one, meaning that all species are similar but very distinct from other insects; once you have seen one dragonfly you would thereafter recognize at once any other species as a member of the suborder. When these busy creatures rest, the wings are kept extended horizontally. Another character is the great size of the compound eyes, which take up almost all of the external surface of the head.

Less well known to the public are the naiads, to be secured in almost every scoop of the net along the bottoms of fresh-water pools and ponds. The adult female lays her eggs in the water or deposits them in submerged vegetation, and they hatch into an aquatic animal that is unlike the adult in general appearance, yet can be seen to be a short, fat and wingless dragonfly after some familiarity with insect architecture in general. These grow with repeated molts and attain a considerable size before reaching naiad maturity, then crawl up out of the water upon some plant stem. The skin slits down the back, and the winged adult emerges and departs, leaving behind the empty nymphal skin, termed the exuviæ, clinging to the reed or stem, where numbers of them form common sights at certain seasons.

Just as carnivorous as the adults, the naiads are colored brown or bright green for purposes of concealment, and constitute one of the terrors of underwater life to other denizens, seizing and devouring any animal they can hold, even small fish and frog tadpoles. Two features of unusual interest are presented by these formidable if miniature monsters; the mouthparts and the respiratory mechanism.

The underlip or labium is hinged so as to fold over the whole lower aspect of the head and is referred to as the mask. Woe be unto the luckless citizen of this watery world who chances to stray too close to the innocent-looking green object; the labium is shot out, unfolding to disclose a death trap in the form of a pair of strong jaws that clutch the victim in a vise-like grip. The dimly suffused cosmos of the hydra and the spirogyra will know him no more, and dragonfly protoplasm waxes fat.

Dragonfly naiads provide one of those incongruous and startling exceptions to general rules in their breathing apparatus, for they breathe with the anus, doubtless the least likely of all portions of the body to be selected for this function. The end of the alimentary canal is enlarged into a muscular chamber, extraordinarily well supplied with tracheæ, the breathing tubes of insects, and here the exchange of gases takes place as the animal draws in water and then expels it in rhythmical alternation.

And whoever heard of a lung serving as an organ of locomotion? Well, such is the case with our subject, who has learned through the ages that forcible ejection of

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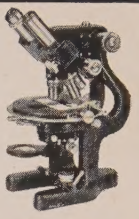

At right is the Bausch & Lomb DDE research microscope. With usual lens equipment it sells for $774.50. It is doing useful work in many of the world's most famous hospitals and research laboratories. At left is the Model R, a microscope built for amateur use. It was designed by the same scientists responsible for the DDE, is built in the same factory, to Bausch & Lomb precision standards. Complete with case and 455-page book written by Dr. J. D. Corrington, it sells for $21.

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water through the anus by a violent contraction of the muscular chamber will propel him rapidly forward in a series of spurting movements! These two specialties—the mask and the anal tracheæ—make splendid and unusual whole mounts for the microscope.

Damselflies, suborder Zygoptera, also constitute a most compact division. They are like smaller, very slender and weaker dragonflies, and hold the wings either parallel to the abdomen or vertically. The head is small, the eyes bulging, and the flights short and feeble. The naiads are more elongate and slender than those of their relatives and breathe by means of three vertical, leaf-like tracheal gills located at the end of the abdomen.

Attractive slides may be prepared from members of the hemimetabola. Recommended are the wings of mayfly, stonefly, small dragonfly and damselfly; whole mounts of entire adults of small species of mayflies, lateral views, showing the extremely long front legs, wings, and elongate caudal setæ; whole mounts of naiads of mayflies and stoneflies particularly, and even of members of the Odonata if small enough for this purpose; the unfolded mask of a dragon- or damselfly naiad, dorsal view; rectal tracheæ of dragonfly naiad and tracheal gills of the damselfly naiad.

Only one of these will need directions additional to those already given—the rectal tracheæ. Kill a dragonfly naiad in alcohol or a cyanide jar, then with small sharp scissors, slit open the caudal end of the digestive tract. Remove the rectum from the rest of the insect, wash well in water, then pin it out flat, inner surface uppermost, on a small sheet of cork. In this manner, carry it through fixing and dehydration through the alcohols to clearing in xylene, then transfer to a slide and mount in balsam, with cover glass props. The complex ramifications of the breathing tubes show up beautifully.

Trade Notes

Inasmuch as our feature article and beginner's primer are both concerned this month with insects, we might as well go all out for this important group of animals, and list two new publications in which you are certain to be interested if insect-minded.

Introducing Insects seems to us to fill a decided gap in the literature of entomology. Neither a manual nor a guide, small as to dimensions and only 129 pages in length, this book does just what the title indicates. There are chapters on why insects should be studied and how to do it as well as how to collect and rear them. Other chapters take up some of the main groups, as bees, dragonflies and butterflies, but no attempt at anything of the sort of a complete guide to all species is made. Economic types receive due attention. Written by the dean of American entomologists, Professor Emeritus James G. Needham, of Cornell University, the style is entertaining and never pedantic. The author is ably abetted by the illustrator, Ellen Edmonson, who contributes a large number of most excellent pen drawings. The Jacques Cattell Press, Lancaster, Pa. $1.50 postpaid.

Ward's Natural Science Establishment, Inc., 302 Goodman Street, North, Rochester, N. Y., provided our photographer with the slides from which our illustrations of insect antennae were made. Their large and important department of entomology has recently issued an excellent 32-page booklet, *How to Make an Insect Collection.* Every sort of collecting device and method is included, the written matter supplemented with 43 drawings. Indispensable for beginners and all but advanced students; 15c postpaid.

Regular readers will recall our reviews of Professor Jaques fascinating guides, *How to Know the Insects,* and *Living Things—How to Know Them.* Now comes another member of this Pictured-Key Nature Series, *How to Know the Trees,* and it is equally well done. Introductory pages on the hows, whats and whys and a list of projects, are followed by the detailed keys. Illustrations for each species include the twig, leaves, flowers, fruit and distributional map. There is also a separate key to genera in winter, a phylogenetic listing, and an illustrated index-glossary. We can do no better in praising these unique publications than to say they are all the best in their respective fields, and indispensable to teacher, collector and Nature student. Pages 152, figures 323. H. E. Jaques, Mt. Pleasant, Iowa; cloth, $1.80; spiral binding, $1.00.

Among new catalogs issued by the Spencer Lens Company, Buffalo, N. Y., we have received *Spencer Polarizing Microscopes* for distribution to our readers. Here will be found chemical and petrographic instruments, from the simpler student models to the most advanced research types, as used in geology, chemistry, medicine and a long list of industrial operations. There is a separate listing of accessories and the illustrations are new and very attractive. To secure a copy, send a 3c stamp to Julian D. Corrington, NATURE MAGAZINE, 1214 Sixteenth St. N. W., Washington, D. C.

American Society of Amateur Microscopists

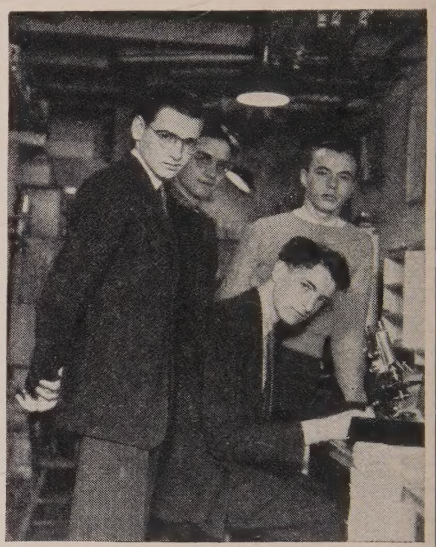
President, Simon Henry Gage, Ithaca, N. Y.
Permanent Secretary, Julian D. Corrington, Chestertown, Md.
Official organ, *Nature Magazine*, Washington, D. C.
Address all communications concerning the Society to Dr. Corrington at Chestertown, Md. Application for Membership form sent on request.

The American Society of Amateur Microscopists is unique among organizations, we believe, in one important respect. With a present membership of but 850, no less than 40—approximately 5%—have voluntarily contributed unsolicited sums, over and above dues or certificate costs, ranging from 25c to $5.00 each, just to help the cause along. Most groups have trouble enough in getting members to pay dues—but when one out of every 22 wants to pay *more*—well, the Society must have something!

It has. It has a spirit of everyone putting his shoulder to the wheel; the good old team work, guaranteeing the success of a movement that was evidently much needed.

An excellent idea of what the A.S.A.M. is accomplishing may be gained from the recent report of Marlowe W. Hartung, Jr., founder and president of the Janseen Chapter, Allentown, Pennsylvania. Chartered in September, 1939, with a nucleus of five members, the group now numbers 18 and has secured Professor J. V. Shankweiler of Muhlenberg College as instructor and advisor. The Hartung family donated the basement of their home as a Chapter laboratory and meeting room, whereupon members pitched in and built large laboratory tables and made cabinets from orange crates. Gas, water and electrical outlets were installed; a chemical balance, chemical cabinets, filing cabinet, stools and glassware were assembled as donations. Later, the floor was covered with linoleum and electric grills, bunsen burners, personal cabinets and desk lights added.

At the present time the Chapter mimeographs its own Bulletin, as well as certain blank forms, and an excellent Introductory Bulletin which is given to prospective new members and explains in full the nature and purposes of the national as well as the local society. Minutes of meetings are similarly



OFFICERS OF THE JANSEEN CHAPTER. LEFT TO RIGHT, CHARLES DIEFENDERFER, SEC'Y; MARTIN BROSSMAN, V. P.; FRED HAAS, TREAS.; (SEATED) MARLOWE W. HARTUNG, JR., PRES. BELOW, A CORNER OF THE CLUBROOM AND LABORATORY OF THE CHAPTER.

duplicated and sent to absentee members. A library has been started.

Probably most important of the numerous printed items, however, are the instruction sheets for slide making, written by Dr. Shankweiler. He has also given the Chapter an order for microscope slides for the college, a procedure certain to maintain interest at a high level. Most ambitious of immediate projects is a plan for a trip to the seashore this summer to collect marine material.

Members of the Janseen Chapter have benefited greatly from their association, but this is by no means an isolated example. Reports from other Chapters are equally enthusiastic and describe similar progress in knowledge, equipment and skill.